Volume 108 No. 4

The OIL WEEKLY

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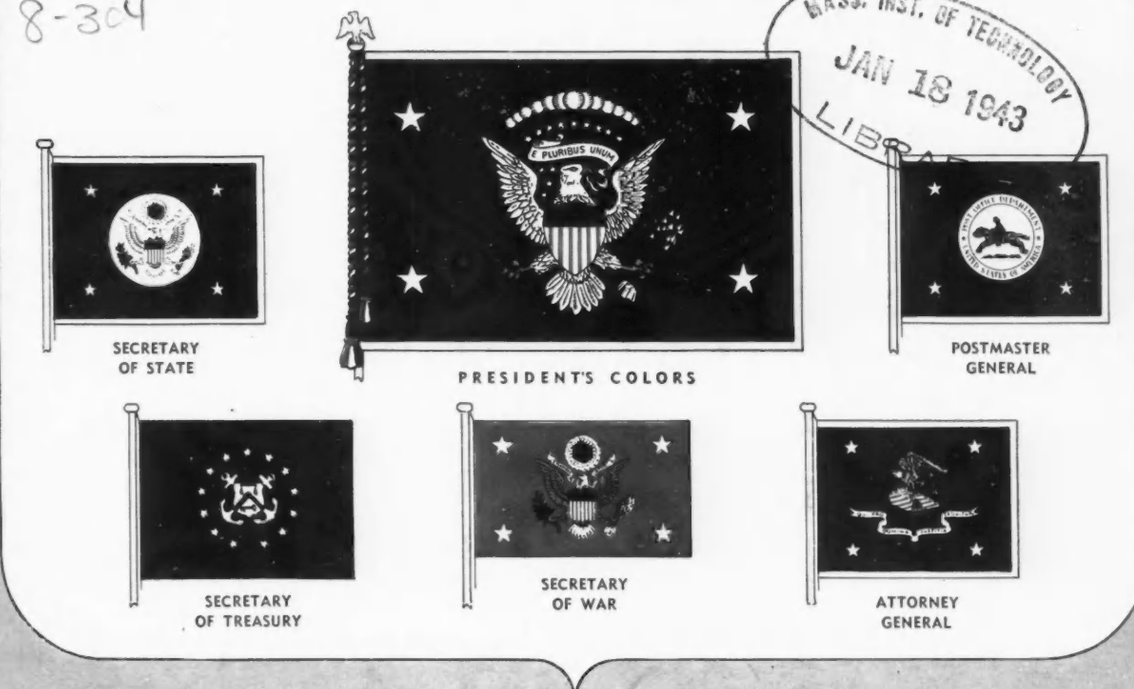

IN POINT OF RESPECT, the President's flag is second only to the flag of the United States. Emblazoned in its center is the President's Seal, which is the same as affixed to treaties, commissions and other important documents bearing his signature.

The flag is raised when the President boards ship and remains aloft until his departure. Its raising and lowering is ordinarily accompanied by a 21-gun salute. It is also flown above the White House or other place established as personal headquarters of the President during his visit.

Each of the nine Cabinet positions has its individual flag and color. Both are of the same design, varying only in size, and each has its specific occasion of proper usage.

Flags of assistants to the Secretaries and Generals in the Cabinet are the same as their superior's, except that the colors of the field and embellishments are reversed; however, the device in the center of the flag remains in proper heraldic tinctures on all except flags of the Secretaries of the Navy, Treasury and Commerce.

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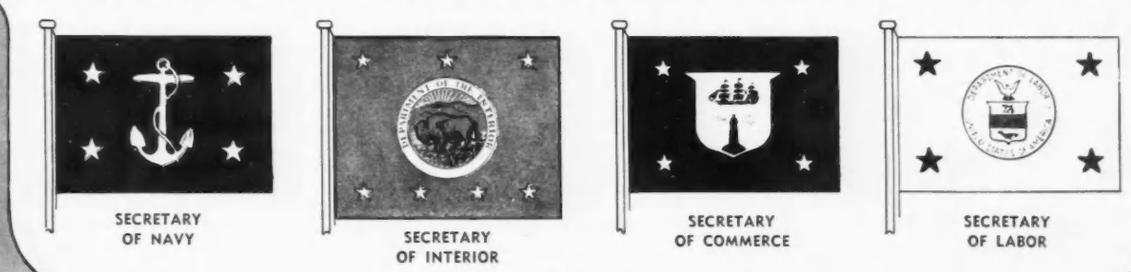

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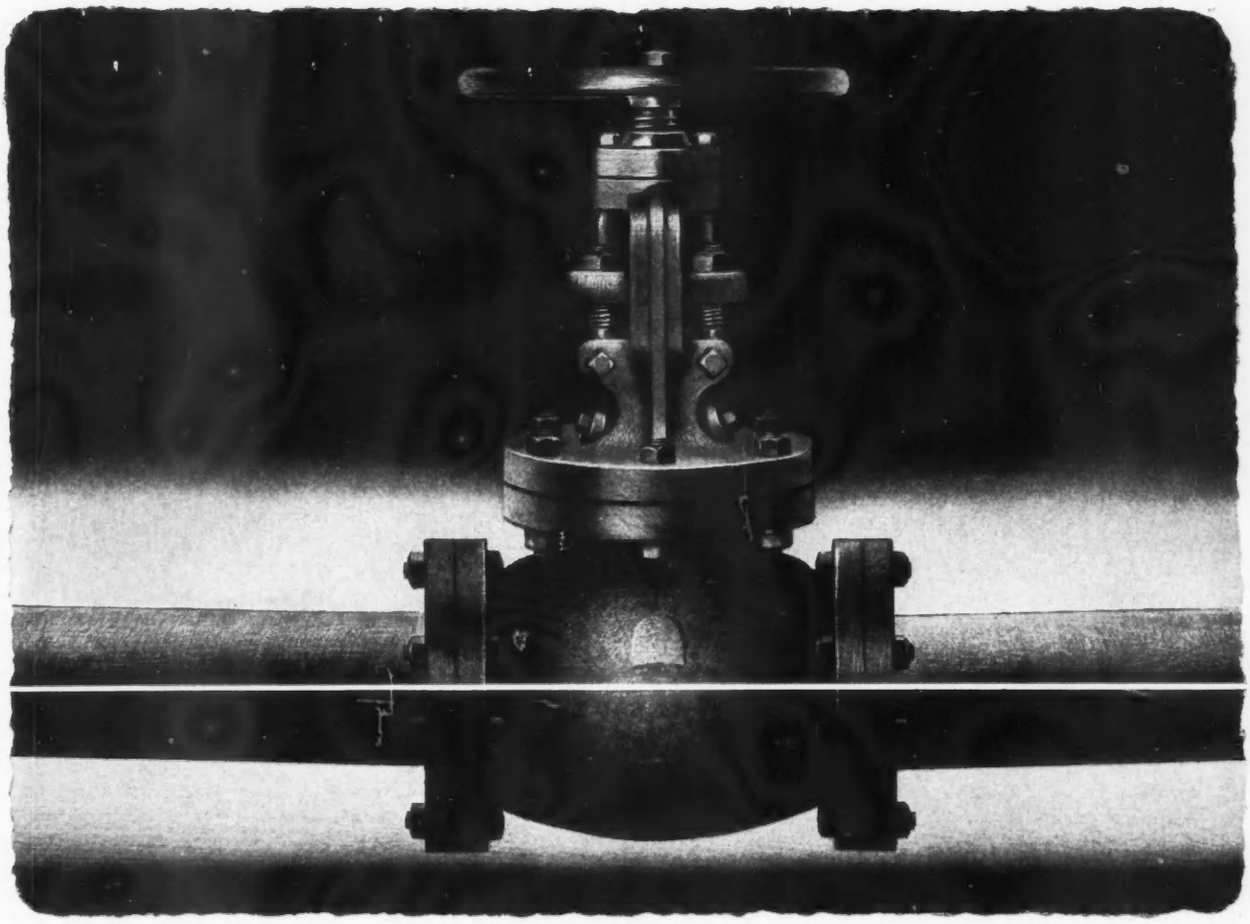

GUARD YOUR VALVES GIVE THEM PROPER SUPPORT!

PROVIDE EXPANSION BENDS OR JOINTS

Don't so install valves that they carry the weight, sag or expansion of the line. Valves are not designed to carry that type of load. Distortion will result in inefficient operation, jamming, and need for early maintenance. Maintenance materials, you must remember, also are on the critical list.

It might be a good idea to approach inspection of every valve with one thought, *"What's wrong with this?"* Guard your valves. They will last longer.

Don't Use Gate Valves or Cocks for Throttling . . .

Gate Valves and Cocks should be opened wide and closed tight. When operated otherwise they are soon ruined, giving unsatisfactory service in the meantime. Use Globe and Angle Valves for throttling.

Write to Reading, Pa., general office, for copy of "VALVE DON'TS" —a poster for plant use that tells things NOT to do to valves.

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LOOKING AHEAD

. . . with the Editor

Proper Installation and Care Put Stretch in V-Belt Life

EVEN more vital in V-belts than in tires, rubber is at once the flexing agent, binder and wearing surface, and without adequate supplies of this vital material the V-belt will fall far short of performing its present widespread and necessary part in driving the equipment of the oil industry.

Rubber shortage, the augmented demand for this material for other war needs, and the consequent lack of replacement belts, makes it incumbent upon every V-belt user to adopt every means which will prolong the service of present equipment.

Collating and abstracting in practical form the various instruction manuals and other data put out by the various manufacturers of V-belts to aid belt users to improve operating conditions and extend belt life, a forthcoming article will present in terse form rules which will enable oil-field belts to drive more effectively, more economically and for longer periods. Emphasis is laid on the need for observing the alignment rules necessary with chain or gear drives in order to obtain maximum service from the flexible, long-suffering, and often grossly abused V-belt. Time spent in insuring that the belt is able to drive without side wear, abrasion, unfavorable conditions such as dampness or oiliness, and with proper tension will pay dividends in extended belt life, less equipment down time, and greatly improved drive operation.

A feature of the article will be a panel of instructions which profitably can be clipped and pasted up in every lease, field or pipe-line engine house for the men of the operating crews, to help them keep in mind the means and methods whereby they may aid in prolonging V-belt life and, by so doing, aid in producing that oil which is ever more and more important as ammunition for the increased war effort of 1943.

Germany's Oil Situation After Three Years of War

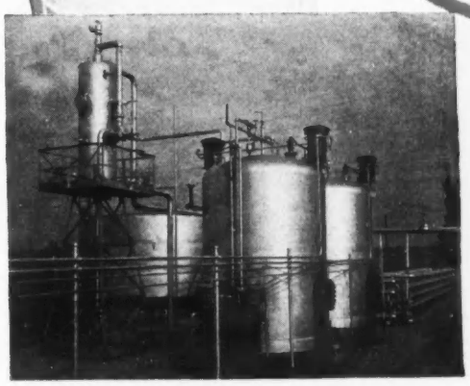
PRODUCTION of crude oil in Germanized Europe may have been increased by about 15 percent under the driving stimulus of war. The output of synthetic fuels probably has been multiplied several times.

Germany's production of petroleum may be greater today than in the past, but so are her needs. With Hitler's failure to blitzkrieg Russia into submission, Germany was forced to fight a continuous intensive war instead of engaging in occasional conflicts with between-period breathing spells. Today, Nazi armies are also battling in North Africa and against the bombing forays of the United Nations directed at Germany herself. All this means that the Germans need larger quantities of petroleum products than ever before, neither has she been afforded an opportunity to replenish consumption with captured booty.

Are her carefully hoarded above-ground accumulations of petroleum exhausted by this time? Will her increased production meet consumption requirements of a highly mechanized army fighting intensively on several fronts? These are some questions that will be discussed by a competent oil observer in an article to appear shortly.

THE OIL WEEKLY, Published every Monday. Entered as second class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.

WAR MAKES VAPOR CONSERVATION VITAL



Vapor escape is not possible with Petreco. The entire flow system is closed.

The treated oil flows from the treater to storage. No additional settling space is required.

PETRECO DEHYDRATING, IN VAPOR-TIGHT TREATERS, IS A SURE CONSERVATION MEASURE

The expansion of the aviation gasoline and synthetic rubber manufacturing programs has increased greatly the need for the lighter gases. It is vital therefore, that producers conserve all the valuable light ends produced with the crude.

The Petreco Electric Process is enabling many leading producers to carry on their dehydrating without danger of vapor losses. The Petreco treaters are vapor-tight, and the emulsion is broken and separated right in the unit, eliminating the need for any additional settling tankage. This "one-shot" treatment eliminates the need for a lot of handling, further reducing the chance of vapor losses.

Many Petreco units have been installed because of the proved savings in gravity and volume. Now that the conservation of light ends is vital to production for war, such savings are doubly important. Petreco engineers will furnish complete information... at your convenience.

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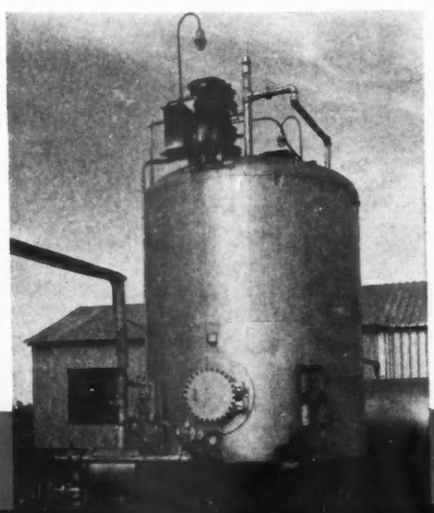


Petreco Electric Dehydrating is preferred for cutting emulsions of heavy crudes and merits definite consideration on the basis of successful past performance.

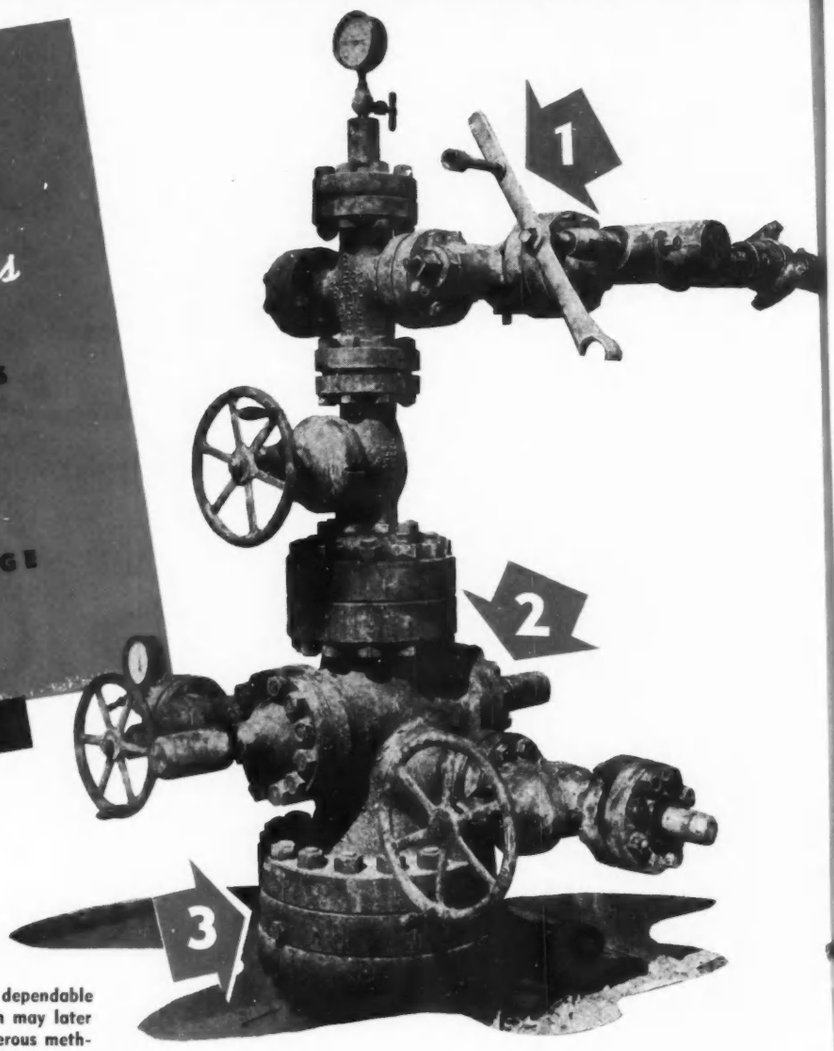
DEHYDRATING **DESALTING**

Essentials for Safe, Economical Completions

1 CAMERON FLOW WINGS AND MANIFOLDS

2 CAMERON RAM-TYPE TUBING HEADS

3 CAMERON TEST FLANGE CASING HEADS



Featuring equipment which provides the ultimate in safe, dependable control during every step of the completion operation and which may later prove indispensable for reworking the well under pressure; numerous methods of suspending and sealing tubing and casing strings, all of which are interchangeable in a single tubing head or casing head housing; secondary plastic packing seals at vital points which may be safely repacked under pressure; and an innovation in flow wings—a unitized flow wing combining all necessary Xmas tree fittings in a single compact unit—Cameron Safety Xmas Trees are truly head and shoulders above the field of completion equipment.

TYPE "D" FLOW WING

The Cameron Type "D" Flow Wing combines four Xmas tree fittings in a single compact unit: (1) A Xmas tree wing valve, (2) a quick change positive or adjustable choke, (3) a two-bolt flowline union, and (4) a bleeder connection. The valve section of the unit permits a quick and easily operated shut-off while changing chokes without the necessity of closing any vital valves on the tree. All parts for the assembly may be readily replaced in the field without removing the unit from the well.

RAM TYPE TUBING HEAD

The Cameron Type "LD" Ram Type Tubing Head provides the ultimate in safe, dependable control during every step of the completion operation. It provides three proven methods of suspending and sealing the tubing string, and obviates the need for a cement retainer when making a squeeze job. It is extremely practical on any reworking subsequent to original completion of the well. Its rams, equipped with Self-feeding Packing Elements, may be utilized for both suspending and sealing the tubing string. Note the plastic packing seal around each ram thrust screw, which may be safely repacked under pressure.

TEST FLANGE CASING HEAD

The Cameron Type "M" Test-Weld Flange, for use above Cameron Casing Head Housings and Spools, removes all doubt as to whether the space between casing strings is sealed. It provides double assurance against pressure leaks. A heavy weld between the welding flange and casing string is the first line of defense. The plastic packing seal below the weld permits the application of hydraulic testing pressure and provides a secondary pressure-tight seal which may be safely repacked under pressure should it ever become necessary.

Despite the incomparable safety and flexibility provided by these units, Cameron Safety Xmas Trees cost no more than ordinary Xmas trees. Complete details on the design and construction of this Cameron equipment will gladly be furnished on request.

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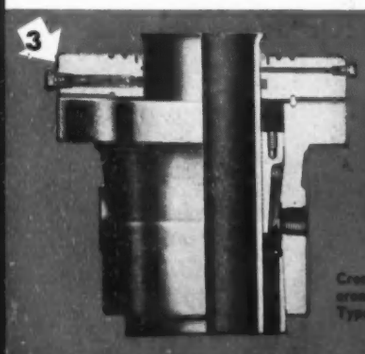
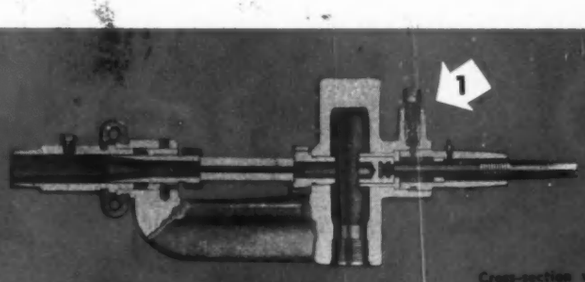
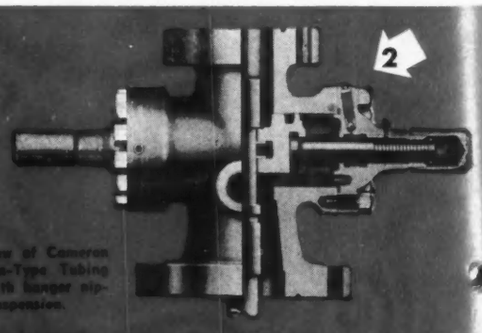


Cross-section view of Cameron Casing Head with Type "M" Test-Weld Flange.



Cross-section view of Cameron Type "D" Flow Wing with screwed connections.



Cross-section view of Cameron Type "LD" Ram-Type Tubing Control Head with hanger nipple type suspension.

THE OIL WEEKLY

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The Oil Man's Calendar

FEB. 4	National Oil Scouts and Landmen's Association, Dallas, Texas.
15–18	American Institute of Mining and Metallurgical Engineers, New York.
APR. 8– 9	American Petroleum Institute, Division of Production, Eastern District, Wm. Penn Hotel, Pittsburgh.
7– 9	American Association of Petroleum Geologists, Texas Hotel, Fort Worth, Texas.
MAY 5– 6	Petroleum Electrical Association, Houston.

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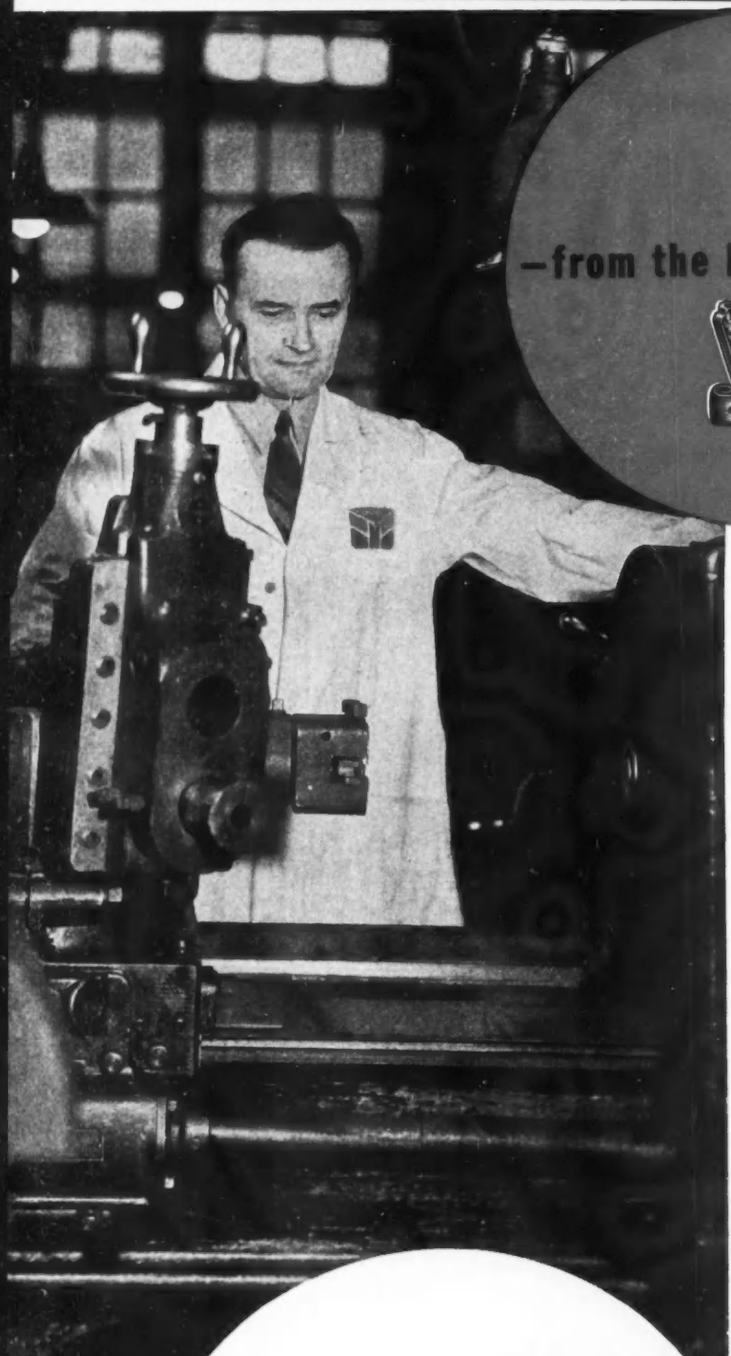


Ideas for VICTORY

—from the Production Lines behind the Firing Line

A Citation for Men in War Industry

HIS METHOD STEPPED UP PRODUCTION OF 20 MM. SHELLS

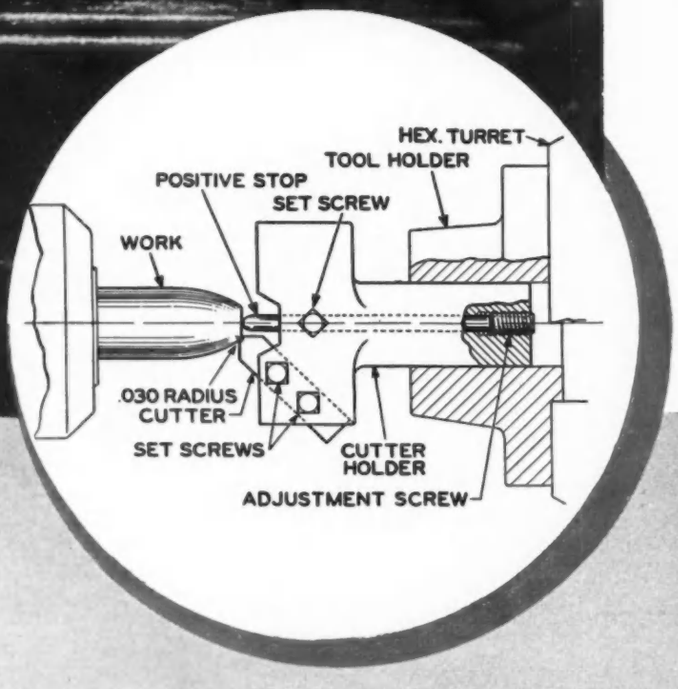
MANY machine tool operators deserve a lot of credit for applying individual ingenuity and resourcefulness to speed war production.

Such an operator is Chas. F. Marshall, setup man at the Oliver Farm Equipment Co., South Bend, Ind.

Operator Marshall developed a tool for machining a .030" radius on 20 mm. shells (see sketch). Because a stop is built right into the tool and locates from a finished face on the work piece, no particular care need be taken in loading work of slightly varying lengths into the spindle. Time was saved, accuracy improved, and production increased about 20%.

In addition to the Victory Pin, presented by Warner & Swasey, Mr. Marshall has been rewarded with a war bond by his company.

Many turret lathe operators have written us, telling how they have used the machines and tools at hand to best advantage. Many of these ideas are passed along in Blue Chips, a shop bulletin now being mailed free to the homes of over 38,000 turret lathe operators. Are your operators on this mailing list? Write Warner & Swasey, Cleveland, Ohio.



WARNER & SWASEY FOR VICTORY

YOU CAN TURN IT BETTER, FASTER, FOR LESS...
WITH A WARNER & SWASEY

The Changing Panorama

Germany Now Short Of Oil Supplies

RECAPTURE last week of Mozdok by Soviet Union troops removed the four-month-old Nazi thrust toward the Russian Caucasus oil fields of Grozny. Thus Hitler's last immediate hope of capturing additional oil supplies appears to have been destroyed.

Germany's requirements of petroleum have increased appreciably in the past year. Failure to overrun Russia, forced the Nazis to engage in their first long continuous intensive battle. This very likely has drained the fuel storage tanks of Germanized Europe, and has given no opportunity for replenishment of stored supplies. In addition, Germany has had to fight in Africa and protect itself from bombing forays of greater magnitude.

Having failed to conquer additional petroleum supplies leaves the Germans with a most serious fuel shortage, according to newspaper dispatches. Russians are capturing German tanks stranded for lack of fuel, it is said. This may explain the relative inactivity of the German air force also. The same newspaper dispatches state Germany has started an overnight drive to increase gasoline conservation, something they have rationed severely since before the war. A decree, it is said, has been issued ordering farmers to convert their tractors and other engines to wood, peat or soft coal-burning generators. Furthermore, a reduction of 20 percent in retail price was offered to all who converted to gas generators at once.

Oil Conversions To Coal Progress

CONVERSIONS of both industrial and domestic oil-fired equipment to the use of coal continues to show progress, according to figures of PAW. Conversion of industrial equipment in the Eastern States now represent an annual saving of 29,839,785 barrels of fuel oil. East Coast domestic conversions account for annual saving of 5,184,000 barrels. Midwest industrial conversions are equivalent to 4,906,794 barrels of fuel oil, but few domestic conversions have been made in this area. Thus a total of almost 40 million barrels of fuel oil per year have been converted to coal.

Industrial conversions now in process will reduce fuel-oil consumption by an additional 8,795,478 barrels annually. Prospective domestic conversions will save another 3,456,000 barrels. Consequently, it appears that a total of 52 million barrels of annual fuel oil consumption will be turned over to the coal industry.

Recent cold weather, coupled with dwindling fuel-oil quotas as supplies reached more acute stages, has brought home vividly the need for converting. A rush to convert furnaces to coal has resulted. It is swamping the boiler, furnace and grate suppliers with orders, many of which cannot fill additional orders for three months. By that time winter will be passing away.

EASIER READING

Effective this issue, readers will note that several weekly features and standard departments appear in new locations. These changes have been made in an effort to further improve the ease of reading THE OIL WEEKLY, and will be followed in subsequent issues.

These changes involve the following:

1. Moving of the "Washington Roundup" feature from the front part of the book back to the central portion. This makes it possible to publish all general news in the same section. Washington Roundup is followed immediately by state and miscellany news. This also makes it possible to eliminate jumps or continuations in the Washington Roundup feature.

2. Henceforth detailed lists of completions and wildcat starts will be segregated from field-development news. This will be done by consolidating completions and wildcat starts in a separate section. Consequently, district or state field development news is presented in a form that constitutes a quick, easily read, digest of important strikes, new pay horizons, extensions, etc. Thus a reader wanting only a fast up-to-the-minute summary of field developments will not have to skip over the detailed completion reports, and likewise anyone interested in the completion reports, for map spotting and other records, will find them consolidated at one position in the book.

Higher Percentage Of Completions Are Dry

AN unusually large percentage of the industry's drilling operations in 1942 resulted in failures, almost one third being dry holes. Dry holes constituted 30.4 percent of all new tests drilled for oil in 1942, in contrast with 24.0 percent in 1941. Exclusive of input wells, disposal wells and deepening operations, the industry drilled 18,376 wells during 1942, of which 5587 were dry holes, while it drilled 29,038 similar type tests in 1941 of which 6984 were failures.

Because the industry's completion of dry holes did not decline in proportion to the decrease in total well completions, it is indicated that its efficiency in completing producing wells was not nearly as high as in preceding years. Thus, it might be concluded that much valuable time was lost in the drilling of dry holes and much critical steel was expended in drilling these non-successful tests.

However, the situation is not as dark as it appears at first glance. The increase in percentage of dry hole completions is due mostly to a larger proportion of the year's drilling activity being made up of exploratory tests, where failures naturally run high. Whereas wildcat tests comprised only 11.2 percent of 1941 drilling operations (still exclusive of input, disposal and deepening work), exploratory activity constituted 16.6 percent of 1942 completions. The 3045 wildcats completed in 1942 accounted for 2563 of the year's 5587 failures, while the 3264 wildcats in 1941 included 2761 of the year's 6984 dry holes. Thus wildcats accounted for 45.9 percent of the 1942 non-successful tests in contrast with 39.5 percent of the total failures in 1941. However, this does not mean that there was a sharp gain in failures among wildcats, for there was only a slightly larger percentage of the 1942 exploratory tests that failed, the figures being 86.1 percent of the wildcats dry in 1942 compared with 84.6 percent dry in 1941.

This all boils down to the conclusion that there was nothing especially wrong with the industry's efficiency, but that the enlarged percent of failures in 1942 was due to a greater proportion of the drilling being wildcats, and naturally more dry holes resulted.

The industry's percentage of failures

will continue to run high as long as development drilling is curtailed by wide well spacing regulations and stress is placed on wildcat activity—which is the outlook for 1943.

Another Line to East Should Be Built

ALTHOUGH the Big-Inch line from the Southwest to a point in Illinois will begin helping to alleviate the transportation situation in February, and the Bayou line and other systems will very shortly also make a contribution to the transportation problem solution, neither of these two lines nor the increased effort on rail transportation will completely solve the problem of moving necessary petroleum products into the war-plant areas of the East. When the big line is finished to the Atlantic Seaboard the help will be more substantial.

At this time the situation is serious. Stocks of needed products are piling up in the refineries of the Gulf Coast while the manufacturing plants in the Eastern areas are needing the oil badly and householders face the danger of a real shortage.

Meantime the second Big-Inch line to parallel the first one is hardly beyond the talking stage in Washington. Even the most optimistically minded person who thinks that Germany will crack this year, contemplates a long period of naval and air fighting before Japan is wiped out. Our tankers will be rather busy for a long time to come —how long of course nobody knows. But it does seem apparent that if a parallel line is needed as a war measure it should be completed in time to use it in this war. We think that the line is necessary to the national war economy, that it should be built promptly and we cannot forget that the present Big-Inch line would be running oil from Texas to the Atlantic at this very minute had its building not been delayed by WPB, while selfish interests urged and applauded the delay.

Will Seek Duration Extension of Leases

CREATION by the Petroleum Industry War Council of a special committee to study threatened widespread lapsing of oil and gas leases due to inability of oil companies to comply with drilling obligations under war conditions, indicates an effort probably will be made to have a bill passed by Congress that will provide for extension of lease rights for the duration under certain conditions.

The committee, headed by Charles I. Francis, Houston attorney, has been asked to determine "if and how existing federal and other laws might be amended to afford protection to those who, purely because of compliance with government orders, are unable to fulfill lease provisions."

It is probable that the bill will require that lessees prove they have made bona fide efforts to secure drilling permits, and for lessees to continue to pay annual rentals.

Such a bill is needed to prevent widespread lapse or forfeiture of oil leases on which war conditions prevent the carrying out of drilling obligations.

—International News Photo.

Every drop of gasoline and lubricating oil is important on the modern mechanized battlefront. This is true even in the jungle fighting of the South Pacific Islands. Here Australian troops on New Guinea gather and bring to shore gasoline and lubricating oil drums dropped overboard from a ship. The supply will keep vehicles of war in action.

☆

Readers may observe that with this issue of THE OIL WEEKLY *one wire stitch is holding the publication together whereas in prewar days three were used. Scarcity of steel wire, priorities, etc. have led to this new method of stitching which is a war-time measure only.*

Record Volume Of Discoveries In 1943

WILDCAT drilling in 1943 will increase sharply, resulting in the discovery of more new oil fields than in any previous year in history. These will add substantially to the petroleum reserves of the United States, as all the nation's important oil sources have not been found by any means.

This is the prediction of a prominent executive of a major oil company.

California Heavy Oil Price Boosts Likely

RUMORS persist that California heavy-crude-oil prices and refined-product prices will be increased by OPA in the immediate future. California prices are the same now as they were in May of 1941. The objective, of course, is the production of increased amounts of heavy oil in California, so the armed forces fighting in the Pacific theater of war will be abundantly supplied.

☆

Owners of the nation's five million commercial motor vehicles must have their tires inspected before January 15. They may not lawfully be operated after that date without an endorsement of an approved tire inspector.

Proper Counterbalancing—An Equipment Conservation Measure

By EMORY KEMLER
Associate Professor of Mechanical Engineering, Purdue University

TODAY, with many of the industry's engineers and men of practical experience serving in the nation's armed forces, lease personnel is composed of fewer technically trained supervisors and many more unexperienced laymen than usual. With counterbalancing of pumping units more important under wartime conditions than ever before, because of the difficulty in securing repair parts and the fact that no other item can make such a difference in pumping equipment operation-maintenance costs or extension of service life, heavy responsibility has been thrust upon these men. It is essential that they be instructed in the fundamentals of proper pumping-well counterbalancing. The best and quickest results can be achieved when this is done in the most simple form possible. This article explains why to counterbalance and how to counterbalance in language and illustrations the untrained lease pumper can understand.

THE increasing necessity of conservation of existing equipment and reduction in size of new equipment makes counterbalancing of pumping equipment assume a very important place in production operations. By properly counterbalancng repairs on existing machinery such as belts, gears, engines, and bearings can be eliminated. No other single item in the operation of pumping equipment can make such a large difference in operating and maintenance costs. The life of existing equipment can in many cases be prolonged by properly counterbalancing existing equipment. When new equipment is to be selected, counterbalance again assumes an important role since a properly counterbalanced well requires much smaller motivating equipment, therefore less critical materials, than one without sufficient counterbalance.

The method of determining if a well is properly counterbalanced can be outlined quite simply and checked by every pumper, foreman, or engineer. This article will discuss in a very elementary manner the way in which a counterbalance works, and outline a simple method of determining whether or not a well has the proper amount of counterbalance. The discussion which follows has purposely been kept elementary in nature but covers the fundamental principles involved. Future articles will cover some of the more technical phases of counterbalancing as applied to pumping units or rig fronts and will show a relatively simple method of determining the proper counterbalance for a power.

For convenience, beam counterbalance will be considered in the examples. The method by which a rotary counterbalance works will be discussed later and the relative merits of each will be discussed in a later article. Fundamentally they both accomplish the same thing and from the standpoint of mechanics are nearly equivalent. The important problem is not whether beam or rotary counterbalance is best, but to get the well properly counterbalanced regardless of whether beam, rotary or a combination of both is or must be used.

If there were no plunger on a string of sucker rods the counterbalancing of a well would be equivalent to the balancing of a see-saw. Every child knows that if a weight or person is placed on a see-saw at a position A as in Figure 1-A, that it can be balanced by another weight B, placed at some place on the other end of the plank as in Figure 1-B. If the person at B is lighter than the one at A the distance from the fulcrum or pivot O to the second person B must be greater than that from O to A. Expressed in mathematical terms the condition for balance is:

weight at A times distance OA=
weight at B times distance OB.

This requirement for balancing is as indicated in Figure 1-C. If the counterbalance center of gravity or point of application is placed close to the fulcrum a large weight is required just as the large man is necessary to balance the average one as shown in Figure 1-C. When the weight is applied far out as shown in Figure 1-C, a light weight is required just as the skinny man can balance the average one shown. While this discussion may appear so simple as to be ridiculous, it covers all the principles of mechanics involved in determining the amount and location of balance. Figure 1-D shows the equivalent pumping unit system corresponding to the see-saw. The sucker rod load corresponds to the average man, and the amount of counterbalance required is determined by the place where the counterbalance is located. In this simple system without a plunger the beam counterbalance could be made to balance the sucker rods and all the pumping equipment would have to do would be to overcome friction in the system.

The equivalence of a beam and rotary counterbalance can be shown as indicated diagrammatically in Figure 2. Figure 2-A shows the beam counterbalance equivalent to the see-saw shown in Figure 1. The behavior of the counterbalance if hung from the beam and guided to move up and down as indicated in Figure 2-B would be for all practical purposes, the same as the beam balance shown in Figure 2-A. If this type of counterbalance shown in

Figure 2-B had a crank attached as shown in Figure 2-C it would still operate the same for this particular position. It would now, however, be a rotary counterbalance. There would be some slight differences near the top and bottom of the stroke, however, the fundamental purpose would still be accomplished. When the rotary counterbalance is used as shown in Figure 2-D it takes advantage of the fact that a light weight at a long lever arm can balance the heavier weight on the shorter arm. Within practical limits the beam and rotary counterbalance will accomplish the same result as far as balance alone is concerned.

When a plunger is installed on the sucker rods a more complicated condition arises. If no counterbalance is used the condition as indicated in Figure 3-A exists. The engine or motor must lift the sucker rods, pump and fluid column on the upstroke. When the top of the stroke is reached and the sucker rods start down, the oil load on the pump is set down on the tubing and the sucker rods will then pull the engine or motor for ½ revolution. This condition is indicated in the diagram by the load being plotted below the zero line. The heavy load on the upstroke will result in the engine or motor slowing down until the top of the stroke is reached. Then the sucker rods start to pull the engine or motor on the downstroke and as a result it speeds up. This alternate slowing down and speeding up is in itself detrimental to good equipment operation. The serious part about such operation is that the load imposed on the equipment is several times that necessary. This high load will cause early failure if oversized equipment is not installed. The lower part of Figure 3 shows the loads on the equipment on the up and down strokes for an ideal case where only static loads are considered. This corresponds approximately to a 3500-foot string of ⅞-inch rods with a 1½-inch diameter plunger. When no counterbalance is used the peak load on the equipment on the upstroke is 10,400 pounds. This 10,400-pound load is made up of a 7800-pound rod load and a 2600-pound fluid load on the upstroke. Since this load opposes the motion of the crank the engine and transmission must supply sufficient power to lift it. On the downstroke the fluid load is supported on the tubing and the sucker rod alone is acting. This 7800-pound sucker rod load tends to pull the crank around and will therefore drive the engine.

Figure 3-B shows the case when a counterbalance equal to the rod weight is applied. The lower part of the diagram shows that in this case the engine or motor has only to lift the fluid column on the upstroke and has no load to handle on the downstroke. The peak load on the equipment on the upstroke is only 2600 pounds as compared with 10,400 pounds for the case of no counterbalance.

Figure 3-C shows a more desirable case where an amount of counterbalance equal to the sucker rods plus ½ the fluid column is used. The net load to be handled by the engine or motor will then be the difference between the rod plus fluid load and the counterbalance or ½ the fluid load. In this case the prime mover does equal amounts of work on the up and down strokes and will therefore operate much smoother. The maximum load on the prime mover and transmission will be only 1300 pounds instead of 10,400 pounds.

The use of counterbalance does not reduce the size of pumping unit structure required. It will reduce the size of belts, gears, and engine necessary for

FIGURE 1

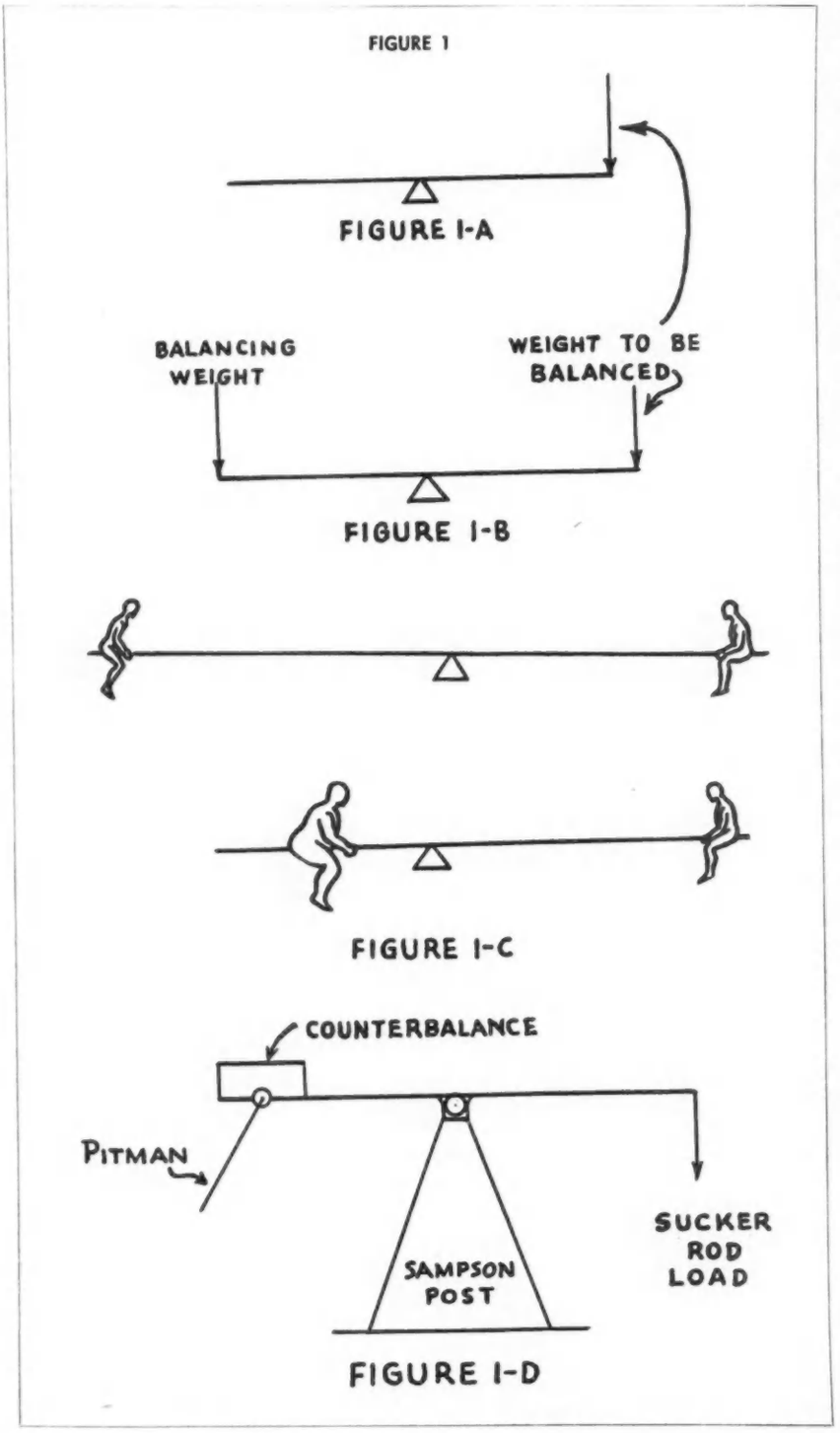
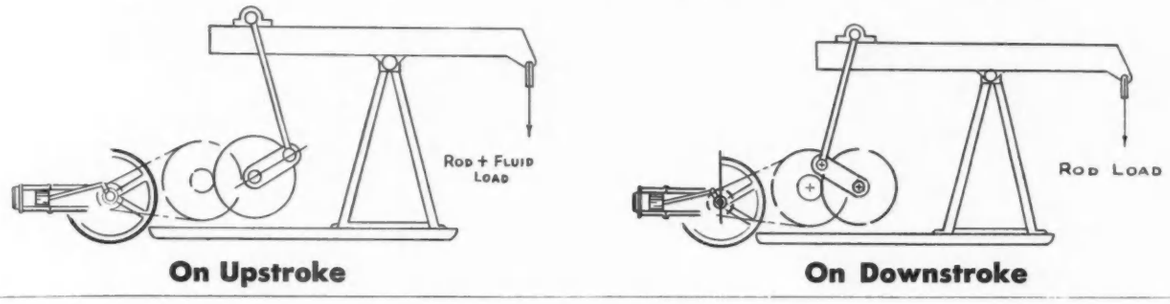
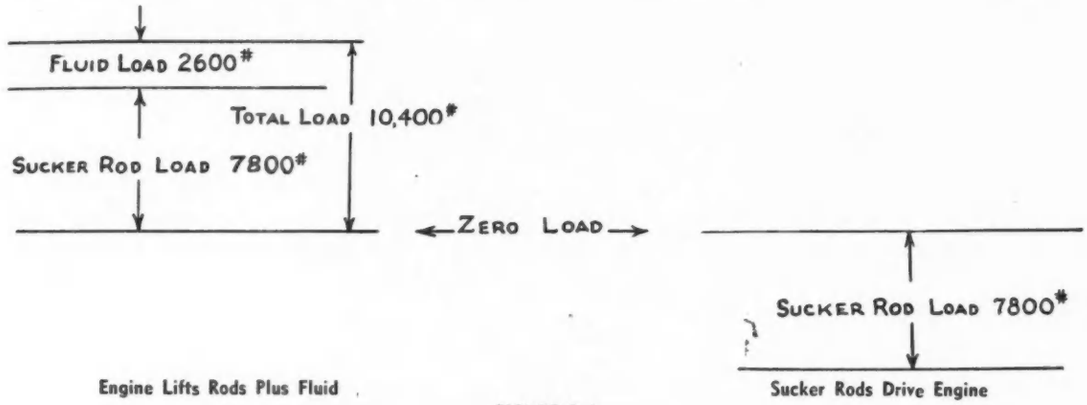


FIGURE 3

Effect of Counterbalance on Both Upstroke and Downstroke



On Upstroke **On Downstroke**

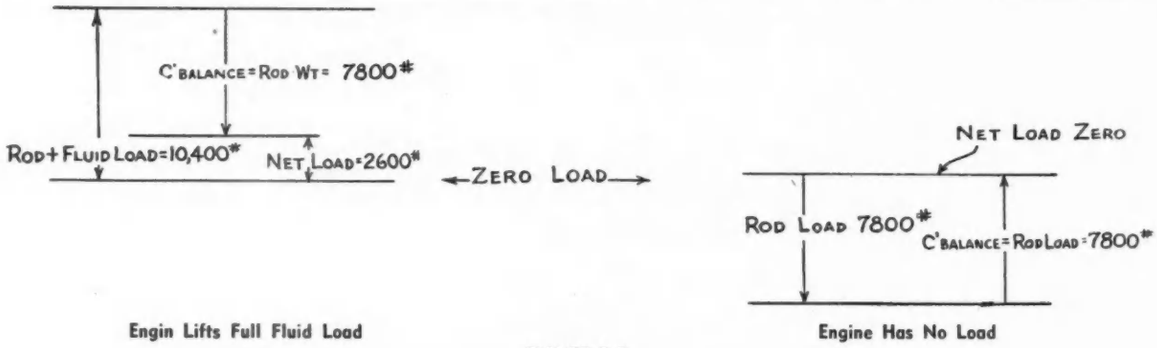


Engine Lifts Rods Plus Fluid

Sucker Rods Drive Engine

FIGURE 3-A

With Well Not Counterbalanced

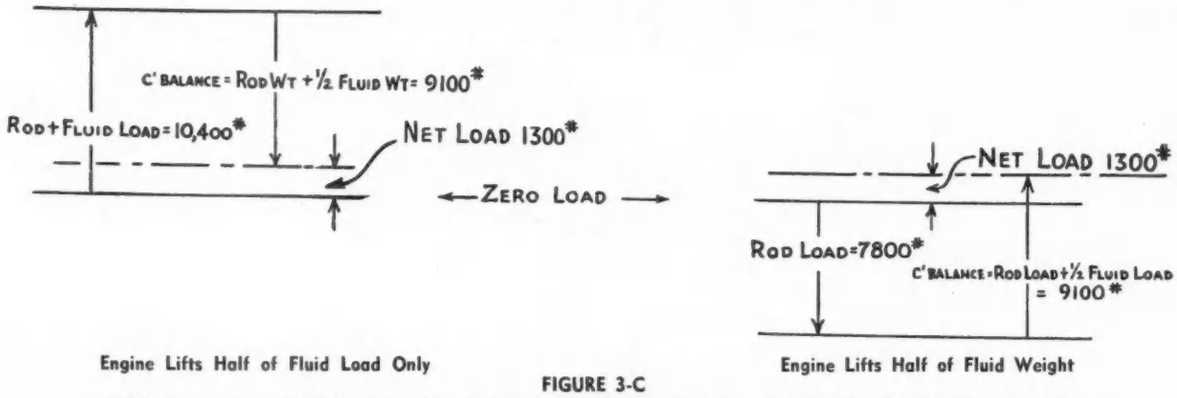


Engin Lifts Full Fluid Load

Engine Has No Load

FIGURE 3-B

With Counterbalance Equal to Rod Weight


C' Balance = Rod Wt + ½ Fluid Wt = 9100#
Rod + Fluid Load = 10,400#
Net Load 1300#
Zero Load
Net Load 1300#
Rod Load = 7800#
C' Balance = Rod Load + ½ Fluid Load = 9100#

Engine Lifts Half of Fluid Load Only

Engine Lifts Half of Fluid Weight

FIGURE 3-C

With Counterbalance Equal to Rod Weight and Half of Fluid Weight

FIGURE 2
Diagramatic Indication of Equivalence of Beam and Rotary Counterbalance

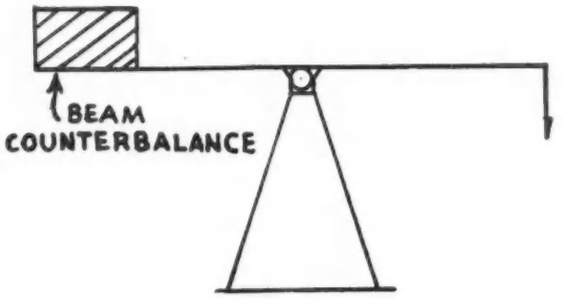


FIGURE 2 A

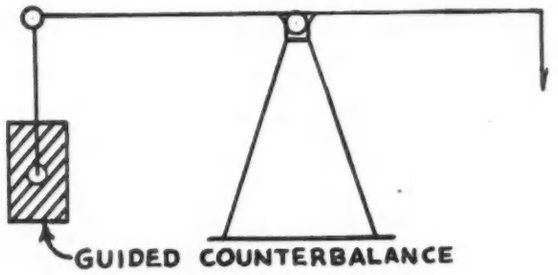


FIGURE 2 B

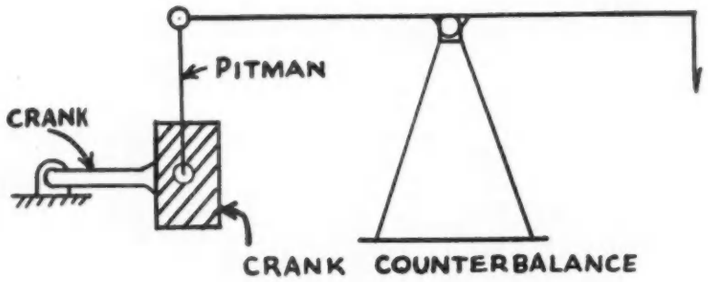


FIGURE 2 C

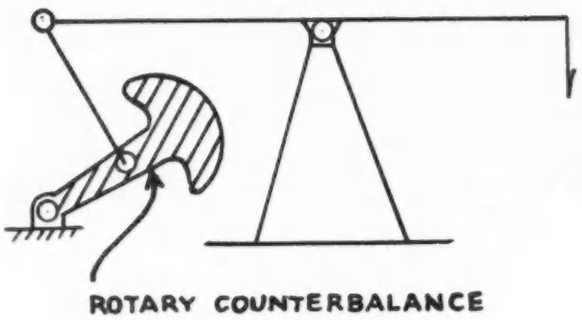


FIGURE 2D

satisfactory operation. In this example, equipment only ⅛ the size without counterbalance would be necessary. For an actual system the reduction will depend on the ratio of fluid to sucker rod weight and on many other factors. Very substantial reductions are however possible.

On equipment already installed this reduced load and peak power will mean less belt, gear, bearing and engine trouble. It will generally mean smoother operating equipment. Where little trouble is at present experienced it will mean longer life. By properly counterbalancing wells the life of much equipment can be extended for the duration thereby resulting in the conservation of much material, equipment and labor.

When new equipment is installed a smaller size of unit can frequently be used if the engineer or manufacturer can be assured that the well will be kept properly counterbalanced. In the interests of conservation operators of equipment should cooperate in this matter of keeping wells properly counterbalanced.

There are several possible means of checking up on whether or not a well is properly counterbalanced. D. O. Barrett has outlined one simple procedure which can be used by any field man. (Proceeding 21st Annual Meeting, API—1940 Bulletin 226 p. 200.) This method uses the clutch which is a torque or power transmitting device to check the torque or power being transmitted. The procedure in this method is as follows: 1. Set the throttle on the engine at a fixed position. 2. Release the clutch slowly to the point where it will pull the peak load. A further release will result in the clutch slipping equally on the up and down stroke if the well is properly counterbalanced. If it is considerably out of balance it will slow up and slip on one side and speed up and hold on the other. A little experience with wells in and out of balance will develop a technique in checking of wells. Usually the speed variation in the case of wells out of balance is noticeable and can be used to check the well. When the throttle is not set at a fixed position the time lag of the governor may cause speed fluctuations that might be incorrectly interpreted so that it is important that the throttle be set before the counterbalance is checked.

Other methods of checking for proper counterbalance will be discussed in subsequent articles together with their engineering basis. The one given herewith has many merits for routine checking in that no equipment is necessary for its use. The other methods have many advantages, but require instruments for their application.

Good Judgment Required to Fight Production Corrosion Problems

By FRANK BRIGGS, Staff Writer

Difficulty of securing equipment, especially corrosion-resistant alloy metals, has forced West Texas producers to depend more than ever on their ingenuity. No magic cure-all to the highly variable corrosive conditions that exist has been found, so use of production horse sense based upon proven alleviation means becomes the most successful method of combatting the situation.

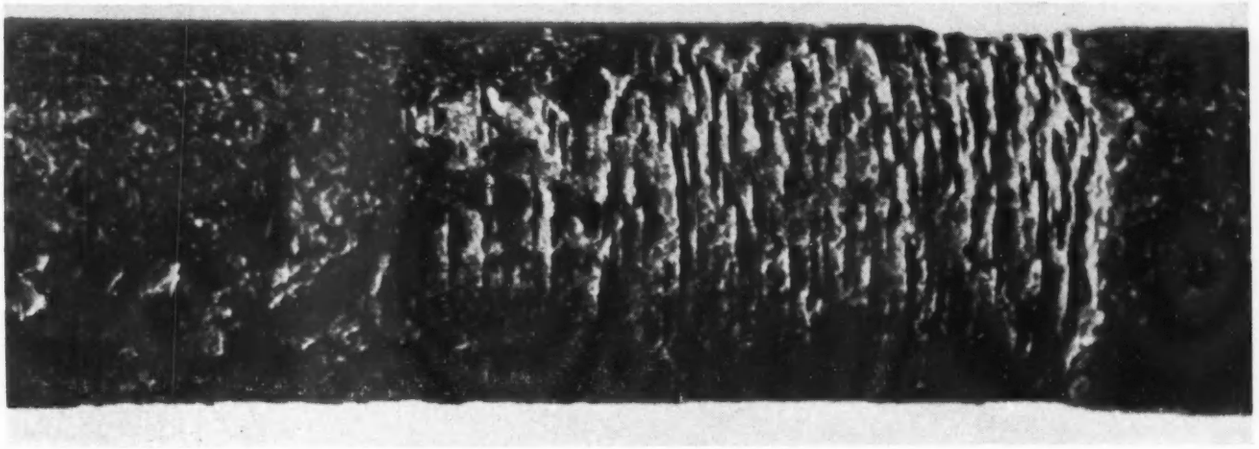
UNDER the stress of war-time operation, the West Texas producer has learned to take advantage of every home-spun idea, every bit of production ingenuity to make his problem wells produce efficiently. Especially is this true where pumping wells are susceptible to corrosion. Experience has shown that there is no universal solution to corrosion problems—good judgment in the selection of the method or equipment used to counteract this condition works with greatest satisfaction.

The requisites for trouble in pumping wells are water, hydrogen-suphide gas, load, and electrolysis. Many of the older fields such as Howard-Glasscock, Penwell, World, and Wink have been geologically graced with an abundance of these characteristics and it has been in these areas where the greater problems, and consequently, the greater experimentation, has been found.

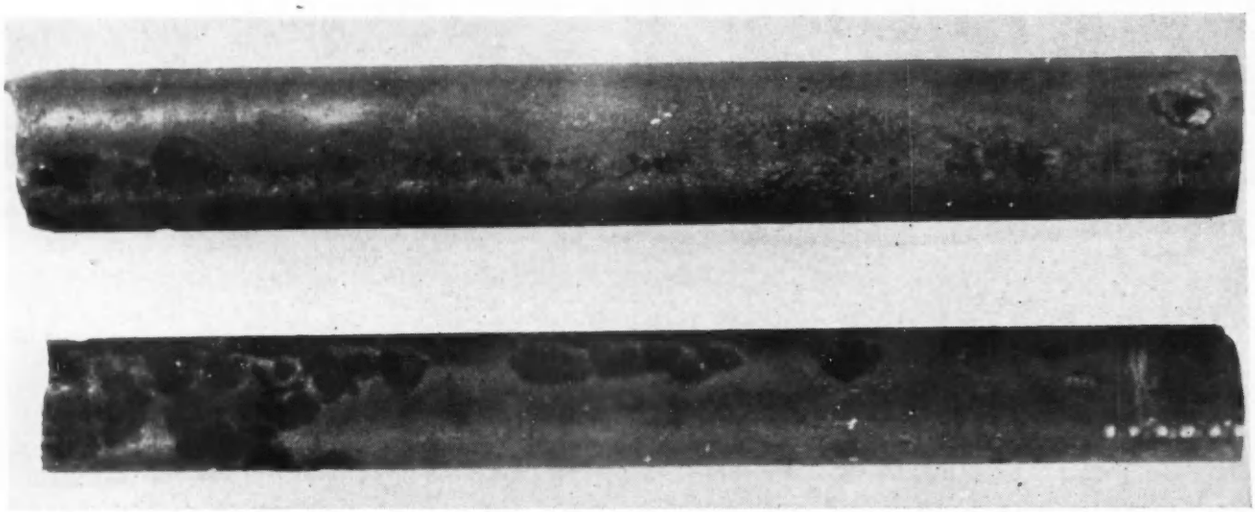
The operators in these particular fields have wrestled with corrosion problems since the wells started pumping . . . and that has been, in many cases, for periods exceeding 15 years. During that time, a wealth of experience, a multitude of methods, equipment, tests—all have passed over the dam and the operator has found no magic cure-all, no piece of equipment, no chemical, no particular treatment that is universally successful in combating the elements of corrosion. There are many means for alleviation of the failures attributed to corrosion—some work, some don't—but the generally accepted method for most successful operation under corrosive conditions is the use of "production horse sense." This involves the selection of adequate equipment to work under corrosive conditions, proper care and handling of equipment, constant culling out of damaged parts, use of proven means for alleviation of the corrosive condition.

Problems Encountered

Electrolytic action, where the rods and tubing act as electrodes and the well fluid as the electrolyte, is one of the most destructive, as well as mysterious, agents of corrosion. With antics similar to those of a bargain hunter at a fire sale, small particles (ions) of one material leave their fellow members, travel through the fluid to another location or may just dissolve and be carried out in the fluid. After a great number have disassociated themselves a small pit forms at the vacated point in the material. This pit is the cancer from which ultimate failure results. Due to a reduction in cross sectional area, a concentration of stress is set up when load is applied to the pitted unit and the process of material fatigue begins its



A typical example of electrolytic action upon a sucker rod. This enlarged photograph shows numerous pits scattered over the rod surface, together with a heavy concentration of this action in one particular area. This "ring worm" corrosion has reduced the cross-sectional area of the rod, thereby setting up stress concentrations which hasten fatigue and failure of the rod.



Two failure samples, ⅞- and ¾-inch sucker rods respectively, show severe corrosion pitting. The points of failure, at the left end of both bars, show the origin of the break to be at a corrosion pit. The larger (top) rod shows "necking" (small sharp point at top), indicating a fatigue failure.

deadly work. The fatigue of a material is hastened by the presence of water and hydrogen sulphide.

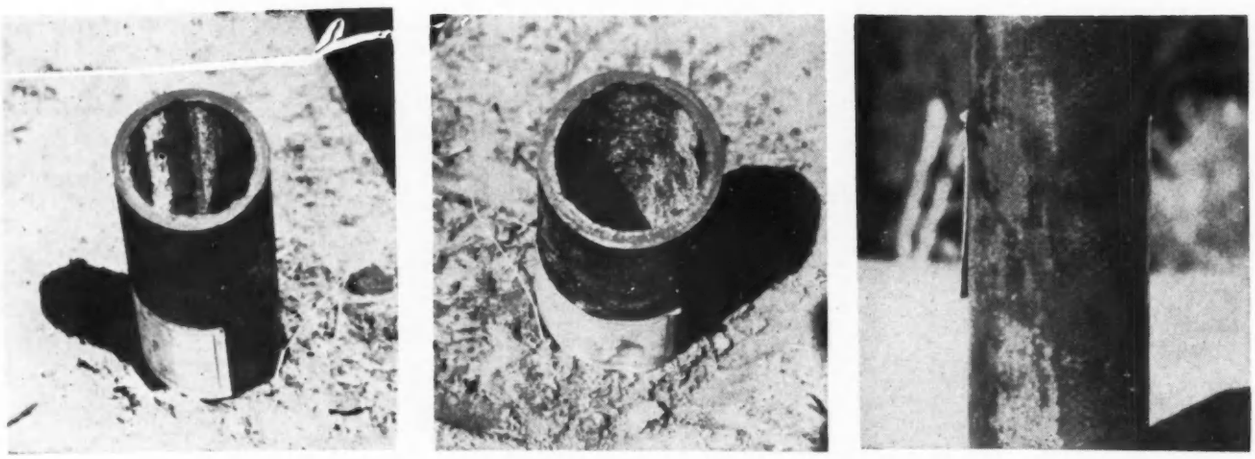
Electrical currents, wandering aimlessly through the most suitable conductor, often stray into wells through lead lines or other connections. These stray currents often have the same effect of electrolytic action and at the point where the current enters another conductor, a pit usually results.

There is another action, prevalent in these areas and which is but slightly understood outside of laboratory circles; this is called hydrogen-sulphide embrittlement. Affected by this action, the material becomes brittle, loses its ductility and will fail under normal use. Sucker rods so stricken have been known to break from bending while "tailing" them out of the well. This change in characteristics is believed to be caused by the hydrogen sulphide forcing its way into the molecular structure of the rod, thus instigating a different relationship between the steel molecules themselves. Sucker rods in this condition are tagged by the field as "crystallized," and it has long been known by the field men that this so-called "crystallization" will soon disappear after the rod has been taken from the well. It is this ability of the steel to rid itself of the intrusion of the gas molecules into its own structure that defies laboratory experiment — for the embrittling condition disappears during the time required for a sample to reach the laboratory.

Test and Experiments

The prime adage, "don't trouble trouble until trouble troubles you," does not apply to the producer of corrosive oil. The characteristic of individual wells should be known, and this is especially true for troublesome wells. In order to take counter measures in problem wells, the condition causing the difficulties must be determined, and this can be done by a comprehensive well study, utilizing a polished-rod dynamometer, water samples and visuol observation. The dynamometer will indicate excessive loads, fluid pound, rod drag and many other conditions responsible for failures which may be eliminated through simple expedients. A water analysis will indicate the corrosiveness of the fluid; visual observation of pits in equipment, of failure samples, of obvious detrimental operation will, when used in collaboration with the first two, provide a working basis for the solution of failures.

A wide-open field for experiment is that involving the determination and study of the many currents flowing in the well system. Evidence of these electric currents can be determined by use of a voltmeter placed between two points in the system. The determination of the amount and direction of current is important in the correlation of this



This short section of tubing was taken from a well in the old World pool after 170 days of operation. One picture (left) shows the effect of electrolytic action lengthwise to the tubing—possibly the result of the motion of the rods. The center photograph shows scattered pits. The third shows the clean outer surface of the tubing—with the exception of a small hole which started from a pit within.

phenomenon with the type and speed of the corrosive attack upon the equipment.

The "pay-off" of course hinges upon whether or not failures of the equipment is stopped by the methods employed. In this, records are of importance and those records that can be constructed to give all of the facts at a glance are the most valuable. One such record is that combined into a chart, used by one of the major operators, which shows tubing and rod failures plotted against the length of time of service. A glance will tell when failures become excessive, whether or not the counter measures have been successful.

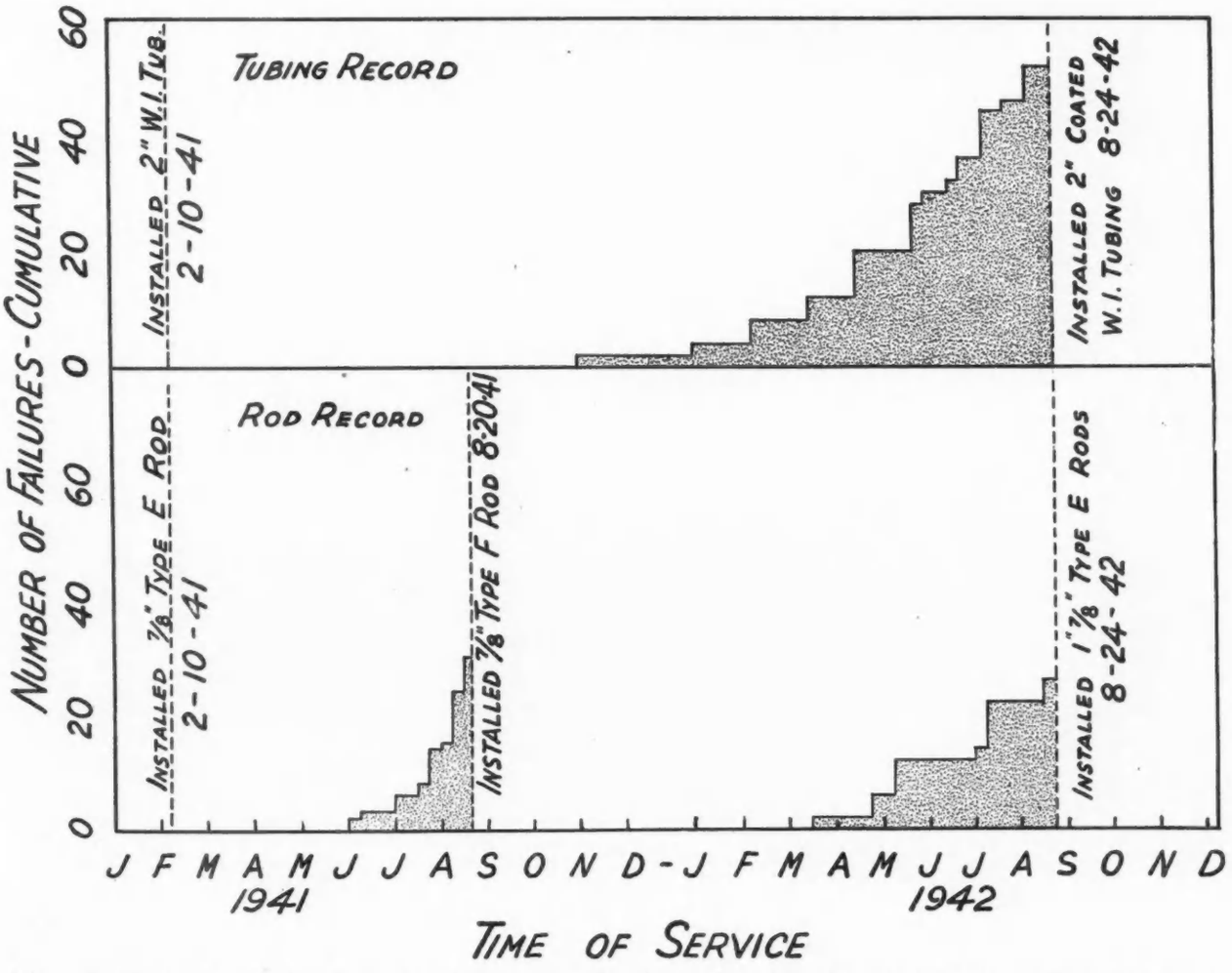
Counter Measures

Previous to the emergencies of war, a producer had a much wider range in the selection of corrosion-resisting material. If he was willing to accept the cost, he could use special alloy parts or equipment coated with special alloy metal. He could purchase rods and tubing high in nickel alloy content; all the gadgets of man's ingenuity was his for a price. However, all that has changed and now common sense and good production practices must make up largely for the expensive equipment that has gone to war.

By far the greatest single factor in sucker-rod failures is excessive load—applied under the fatiguing conditions of water and hydrogen sulphide combination. The simple expedient here is to change either the pump size or the normal operating speed—or to use larger rods, if possible. Often a smaller pump will "make" as much fluid as a larger one if the length of pumping stroke or the speed of operation is altered. Sometimes only the normal operation needs to be reduced to curtail excessive loads. In other words, more moderate operation is the answer in this case.

The problems presented by the corrosive action of electrolysis are many and vary from field to field; likewise the results of counter measures to this action. For instance, a large producer in the Howard-Glasscock area reported greatest success with monel sucker rods. Another, operating in the Wink area, reported sucker-rod failures dropped from 10 or 12 per month per well to 1 or 2 when zinc rod guides were used. The same producer said that it appeared corrosion-resisting rods only intensified the attack of this agency upon the tubing. It is logical, therefore, to discuss results by locations.

The Howard-Glasscock area has been one of the most troublesome fields to pump in West Texas. This field, which produces a great amount of water, the average sulphate and chloride contents being 4000 and 50,000 ppm respectively, has been the testing ground—and sometimes graveyard—for practically every new material and device designed to combat corrosion. Here the greatest success against failures has been obtained with very usual methods; if load was a factor, larger sucker rods were installed or normal operation was moderated; tubing and rods have been constantly inspected, culled and classified, thus assuring undamaged equipment for


TUBING RECORD
ROD RECORD
INSTALLED 2" W.I. TUB. 2-10-41
INSTALLED 2" COATED W.I. TUBING 8-24-42
INSTALLED 7/8" TYPE E ROD 2-10-41
INSTALLED 7/8" TYPE F ROD 8-20-41
INSTALLED 1" 7/8" TYPE E RODS 8-24-42
NUMBER OF FAILURES - CUMULATIVE
0 20 40 60 0 20 40 60
J F M A M J J A S O N D - J F M A M J J A S O N D
1941
1942
TIME OF SERVICE

This sample chart shows how a major operator plots the service record of sucker rods and tubing. This particular chart is readily understood, can be easily maintained. Its value lies in the fact that excessive failures, determined at a glance, indicate when replacement should be made.

the worst wells; good field practices in handling rods and tubing have been established. Rods and tubing of wrought iron have served well.

In the Penwell field, the major effort has been to curtail electrolysis and stray electric currents. One large company in this area made extensive tests and found currents as high as 2.5 amps entering wells and tanks from gathering and lead lines. Use of insulated flanges on these lines cut the flow of this current drastically. Where a large amount of water was conducted in the pipe, flumes were installed to prevent the electric current from by-passing an insulated flange through the water stream. Chemicals, injected in the tubing-casing annulus, purported to cause a protective coating to adhere to the rods and tubing, have been tried in this area. Zinc, either molded to the rod or placed in a container on the rod, or inserted in perforations in the chamber below the pump, has been used. The purpose here is to offer the zinc (it being more readily soluble in the fluid) for the electrolytic action rather than the rod.

One particularly effective method of eliminating corrosion problems hinges upon the availability of gas. In two wells in this area, one operator replaced his pumping units with gas valves, thus eliminating rods. The tubing was coated on the inside with a chemical, applied in five layers. Where gas is at hand and there are no hinderances to the use of gas lift, this seems a very good solution to severe electrolytic corrosion. The chemical mentioned is in development stages and therefore not procureable but it is believed that any of the better rust paints on the market will suffice for spraying the tubing walls.

In all are areas where hydrogen sulphide contributes to rod failures, it has been found that merely taking the string out of the well and laying the rods down for some time often improves the service from them. This is particularly true if the rods are not already damaged by fatigue cracks—the result of high polished rod loads. In areas where the sun is sufficiently hot, exposure to its rays is helpful; in others, heating the rods by the means available aids in reducing failures.

The Wink area has presented the problem of high loads combined with a corrosive condition. The amount of water to lift requires the use of large pumps operated at fast speeds. One major operator here, who has experimented with equipment in these wells, found that very pure zinc molded in the form of a rod guide to every other rod for a depth of 1000 feet in the top of the string, was successful in reducing failures caused by corrosion. It was also found that an important factor in selecting sucker rods was the carbon content; it should be within the range of .15 to .30 percent. The nickel-alloy content of the steel was of next consideration and this should be high. It was found best to use tubing approximating in chemical character that of the rods. Failures from high loads have decreased due to the fact that many of the wells in this area are producing from higher levels. This has been made possible by the high fluid level maintained by the water drive in this field.

Where corrosion is a problem in the cooling system for engines, compressors, etc., the remedy appears to be much more simple. In this case one operator has found that by using a water softener and also maintaining "reactive" (pH) value for the water of 8.3 or above, electrolytic corrosion within the system is negligible.

Application of Countermeasures

The selection of proper equipment involves the two items of tubing and rod string. With tubing, the selection is between manufacturing processes largely rather than chemical or alloy content. However, tubing fabrication such as wrought iron can be specified. Sucker rods, while more involved in alloy content, have been more or less standardized as to type (previous to wartime measures) and the tabulation shows one manufacturer's recommendations.

Fluid and Load	Steel No. S.A.E.	Main Alloy
Non-corrosive Heavy load	1335	High manganese
Non-corrosive Medium load	....	Low manganese
Non-corrosive Light load	1045	Carbon, silicon steel
Corrosive Heavy load Embrittling gas	4620	Nickel, molybdenum steel
Severe pitting Medium load	....	Wrought iron, Nickel molybdenum iron

Where no S.A.E. numbers are shown, that particular heat of steel is modified to the manufacturer's own specifications. The special types of rods, such as bronze, monel, etc., have been manufactured in the past in test quantities only. Such high-priced alloys have now been shunted to more vital uses.

The field application of zinc to the rods is a process of molding. The mold should fit around the rod, be approximately five inches in length and contain enough volume to hold between 2 and 5 pounds of zinc. The rod should be prepared for the zinc by cleaning the surface of all scale and then slightly roughing so that a good bond between the rod and the zinc may be obtained. Only pure zinc should be used.

Zinc inserts for specially prepared cages are commercially manufactured and may be obtained where the producer does not desire to mold his own zinc protectors.

The inspection of rods and tubing is a technical service rendered by a few specialized companies. Pitted rods can be found and discarded by the field personnel but a new and intricate device is required to locate the small fatigue cracks prevalent in rods subjected to high loads and corrosive fluids. Inspection of the tubing walls is also an involved process but one that is available in most localities. A very comprehensive description of these two inspection processes was published in THE OIL WEEKLY, March 17, 1941.

Insulated flanges for lines are manufactured commercially. These flanges are installed between the suspected source of the electric currents and the part to be protected, whether it be well or storage tank.

The chemical processes for combating corrosion are of two types: those that tend to change the fluid characteristics from "acidic" to "basic," and those that form a protective "sludge" coating on the tubing walls and the surface of the rods. The first method is used mainly in closed systems of small dimensions, such as the cooling system of an engine. The sludge coating chemical is sold commercially and usually involves injecting the chemical in the casing at regular intervals. In each case, instructions for the use of these chemicals are provided by the manufacturer.

Summary of Problems in Corrosive Fields and Corrective Measures

Area	Problem	Corrective Measures
Howard-Glasscock	Heavy P.R. Loads Electrolytic Action H_2S Embrittlement	Larger rods, moderate operation Monel rods, culling operations, zinc Resisting material, exposure of rods to sun
Wink	Heavy P.R. Loads H_2S and H_2O Electrolysis	Larger rods, pump raised Zinc molds, careful selection of material Insulated flanges on lines
World Pool	Electrolysis H_2S and H_2O	Wrought iron equipment, zinc
Penwell	H_2S Embrittlement Stray currents	Chemical coating, larger rods Insulated flanges on lines, zinc Use of gas-lift + coating tubing walls with resisting paint or chemical

Application of Gravel Packing To Unconsolidated Sands

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Production expense reduced, and risk of sand abrasion and liner collapse eliminated in area having acute sand problems by use of gravel packing

BY EARLY 1939 it was apparent that problems caused by the fine unconsolidated character of the producing sand in the Wilmington field, California, would be a serious obstacle to the efficient recovery of a large part of the tremendous oil reserves which had then been proven. This situation has been corrected to a considerable extent by application of improved gravel-packing technique and installations.

Circulated gravel packs and prepacked liners have both been used successfully in the Wilmington field in preventing sand production. Operators with a large number of wells to drill, desiring to realize savings from use of smaller water strings with liners of equal inside diameter, have made the most extensive use of circulated gravel packs. Smaller operators with fewer wells have not been as prone to develop the specialized equipment and supervision necessary for the successful use of circulated gravel packs, and have used the prepacked liner almost exclusively.

The Tar, Ranger, and Upper Terminal zone sands are extremely fine and

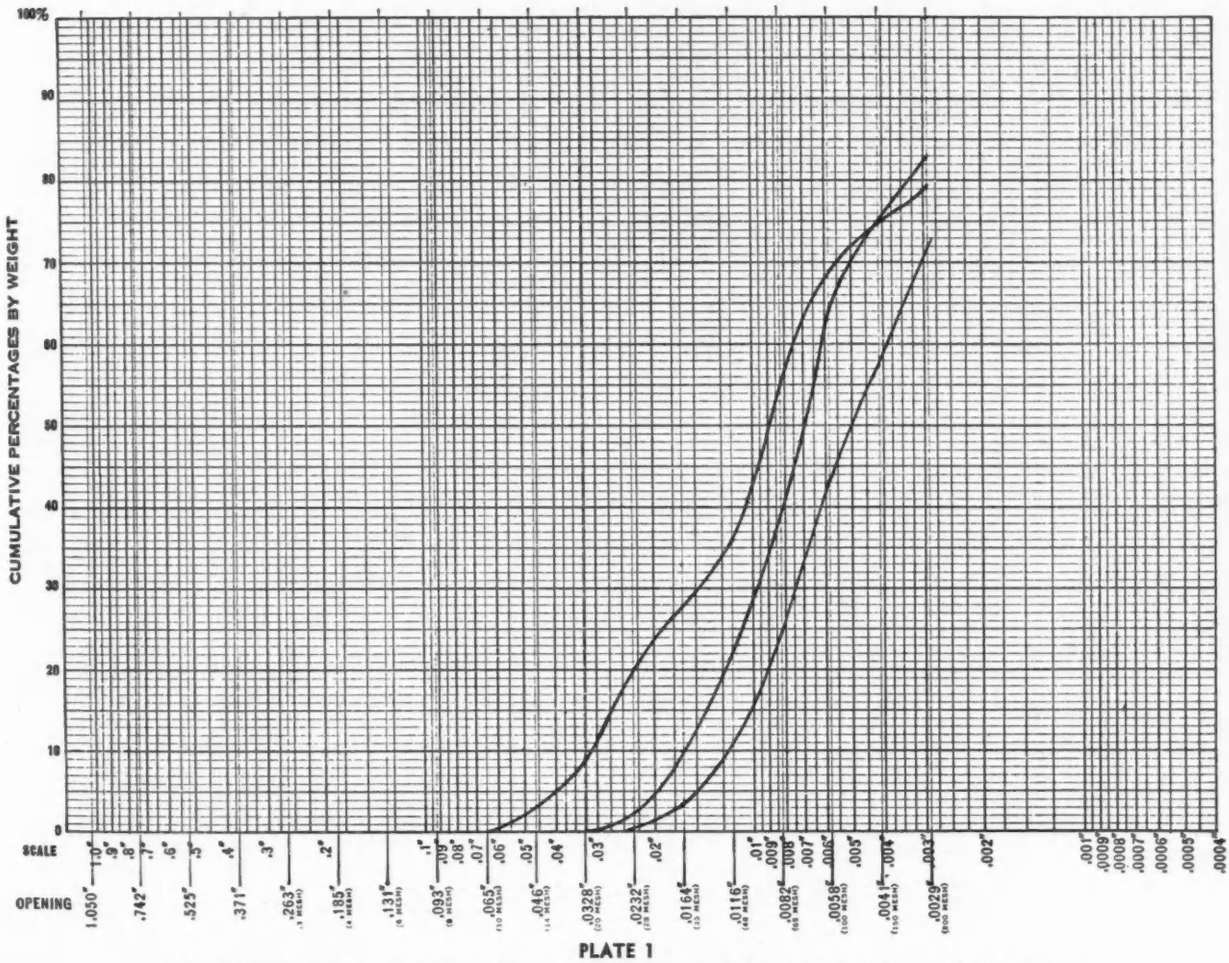


PLATE 1

Curves showing typical sand grain analyses of the Tar, Ranger and Upper Terminal Zones at Wilmington.

One manufacturer of prepacked liners employs an outer sheath of punch-perforated rectangular slots. Slot width is such that no gravel will be lost, and while it retains 60 percent of the bursting strength of the unperforated sheet, it provides an open area of 32 percent

contain a large percentage of silty material. They contain no appreciable amount of cementing material and are loose to scarcely consolidated.

All these zones consist of alternating sands and shales. The Tar varying in thickness from 250-400 feet with 40 percent sand, the Ranger zone from 200-500 feet, 15-30 percent sand, and the Upper Terminal from 200-500 feet, 50-70 percent sand. Sand porosity averages over 30 percent and permeability about 500 millidarcys. Plate I shows typical sand-grain analyses.

Oil produced from these zones exhibits extremely rapid increase of viscosity with decrease in gravity in the range below 20° API. This is illustrated by the results of determination of viscosity of three samples of oil under reservoir conditions. In these tests, 15.9° API oil had a viscosity of 50 centipoises, 24° API oil 3.5 centipoises, and 30.5° API oil 1.2 centipoises.

Wells producing low-gravity oil from Tar, Ranger, and Upper Terminal zones showed, from the beginning, a tendency to produce considerable quantities of sand with the oil. The sand at times heaved into the well, filling the entire liner, especially when attempts were made to produce wells at excessive rates. Sand problems in wells producing higher-gravity oil of lower viscosity were of less consequence and such wells have, with a few exceptions, experienced little trouble.

Clean-Outs Costly

Frequent cleanout jobs, pulling of wells to repair and replace pumps, and necessity of restriction of production rates to avoid the excessive entry of sand into the hole resulted in production costs in some wells which exceeded income.

As time went on, liners in many wells were found to be collapsed. Perforated casing pulled from wells had a large percentage of the perforations plugged and the ones that were open were cut by sand abrasion to many times their original size.

Most of the original liners were perforated with 60- or 80-mesh slots and a considerable number with 40- and 50-mesh slots or 1/8 to 3/32-inch round holes. All were ineffective in controlling sand entry. Experiments with 30-mesh slots resulted either in abnormally low production rates or eventual cutting out of perforations.

From early in 1938 on more and more of the wells which had been drilled in the Wilmington townlot area during 1937 were in such condition that redrilling from the shoe of the water string and installation of new liners was the only possible means of keeping the wells on production.

A number of wells were redrilled and equipped with new liners, most of which were perforated with 60- or 80-mesh slots, however, before many months the newly installed liners were often in as bad condition as the original liners had been.

Gravel packing of liners, accomplished by circulating gravel into the well to fill the annulus between the perforated liner and the walls of the hole, had been tried in several original completions late in 1937 and early in 1938. Because methods of packing were not yet perfected, some of the attempts to gravel-pack liners resulted in expensive fishing jobs and others failed in their purpose of preventing entry of sand into the well because of inability to successfully pack the entire liner.

For these reasons, together with the fact that gravel packing as then practiced was expensive and time consuming, further use of this method of sand control was abandoned for the time being. Extensive experimentations and development of special equipment has since resulted in eliminating practically all these hazards.

Prepacked liners, in which the annulus between the slotted liner and an outer perforated sheath is packed with gravel before placing the liner in the well, came into use during 1939 and after it became apparent that this type of liner afforded an effective means of preventing entry of sand into the well a campaign of redrilling started which has continued until the present time. At the same time, renewed activity in the drilling of undeveloped portions of the area followed the introduction of prepacked liners. Since early in March, 1939, most completions and recompletions in the Tar, Ranger, and Upper Terminal zones have been made with prepacked liners in the hole. A smaller number have used the circulated-gravel

pack and only very few conventional liners.

Prepacked Liners

Perforated liners which are prepacked with gravel in the annulus between the liner and a perforated outer sheath before being run into the well, have come into general use among small operators at Wilmington.

The most important factors affecting the performance of this type of gravel screen are:

1. Selection of proper gravel size.
2. Provision of ample area of perforations in outer sheath.
3. Uniform tight packing of the gravel in order to prevent movement of gravel and possible uncovering of perforations before the liner is landed.
4. Thorough removal of mud and filter cake from the well before placing on production.

Selection of proper gravel size has been the subject of much experimentation and is covered in a general discussion of the selection of gravel size elsewhere in this article.

Perforated outer sheaths used in prepacked liners are generally made of plates punched with 3/32-inch round holes on 5/32-inch centers, 60-mesh horizontal slots, or woven steel wire screen. These types have 25 percent to more than 30 percent of their surface consisting of perforations and have performed satisfactorily. Outer sheaths resembling conventional slotted liners in percent of area perforated have not yielded as high initial rates in comparable wells.

Tight packing of gravel is accomplished by various types of mechanical vibrators which pack the gravel as it is introduced into the annular space between the slotted liner and the outer sheath.

Removal of mud and filter cake from behind the prepacked liner is most effectively accomplished by thorough washing with water circulated down through a wash pipe equipped with swabs on the bottom to force the circulating water out through the gravel sheath. Starting at the bottom, the wash pipe is continually raised and each foot of hole thoroughly washed.

Use of mechanical scratchers to scrape the mud cake from the walls of the hole during the washing operations results in more thorough cleaning. Since liner hangers with packers must be used in these wells, delayed-action packers or hangers with ports below the packing element are used to permit free return circulation while washing. The packers are set or the ports closed after completion of the washing.

Common combinations of outer sheath and casing sizes used in prepacked liners are 7½-inch O.D. sheath with 5¾-inch casing, 7¼-inch O.D. sheath with 5½-inch casing, 6¾-inch or 7-inch O.D. sheath with 5-inch and 4¾-inch casing. Since the outer sheath is about ⅛-inch thick this results in a gravel thickness of ¾-inch to 1-inch. Lately there has been greater use of ½-inch to ⅝-inch gravel thickness. The thinner pack is satisfactory providing the gravel is small enough to form at least three layers.

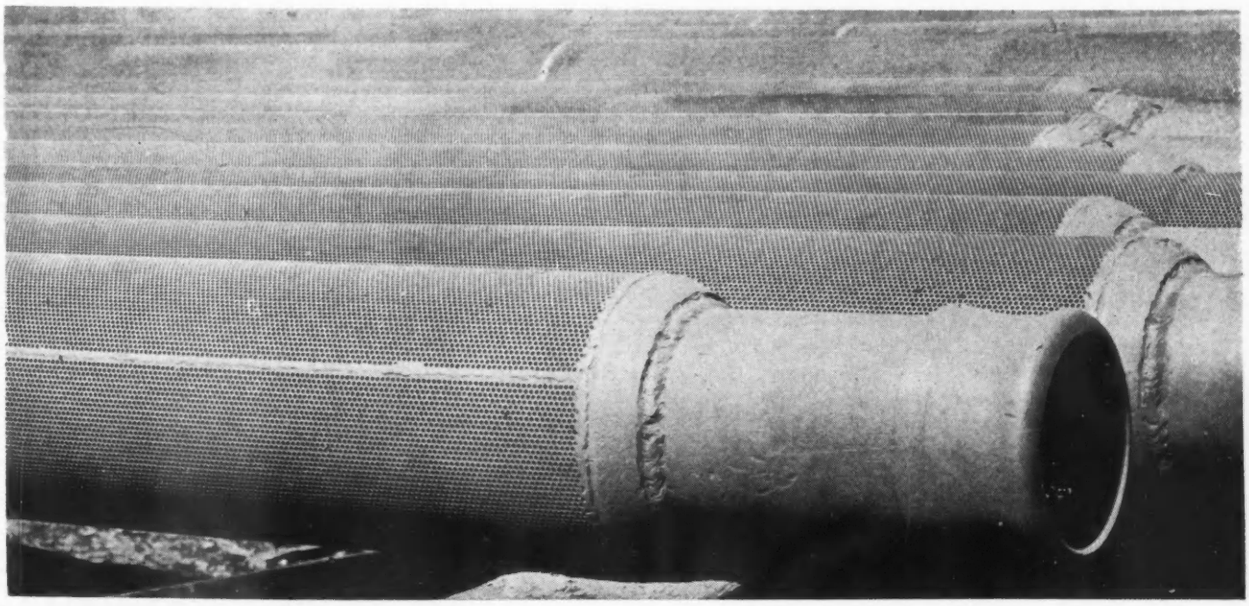
Each joint of perforated pipe to be used in a liner is prepacked as a unit with enough blank pipe extending above and below the prepacked section to allow room for applying slips and tongs. It is common practice for the gravel pack to extend about one foot above the top of the perforations to prevent perforations being uncovered by settling of gravel. The perforated plate or screen forming the outer sheath is fashioned into cylindrical sections of the proper diameter which are slipped over the joint of pipe and welded together to form a continuous perforated sheath, which is secured to and properly spaced from the pipe by rows of spacing lugs or continuous ribs running longitudinally. A solid steel ring at the lower end of the perforations is welded to the pipe and to the sheath.

With the annulus at the top of the joint open, the pipe is suspended from a boom and lowered into a vertical hole. Gravel is introduced into the annulus while the pipe is vibrated mechanically to firmly pack the gravel. When packing is complete a steel ring is slipped over the top of the joint and welded firmly to the pipe and outer sheath.

Several types of mechanical vibrators have proved satisfactory but it has been found that proper adjustment of the frequency and intensity is necessary for most effective packing and that gravel must not be introduced too rapidly.

Circulated Gravel Packs

Gravel packing in Wilmington was first accomplished by introducing gravel into the circulating fluid which was directed down the outside of the liner with a wash pipe for return circulation hung near the shoe of the liner. As first practiced, this method often resulted in incomplete packing of liners due to bridging of formation outside the liner and at other times in expensive fishing



One type of prepacked liner uses an outer type of sheet metal perforated with round openings. These are 3/32-inch holes on 5/32-inch centers. All prepacked liners are vibrated constantly when admitting gravel to assure uniform pack.

One type of outer sheath consists of a steel wire woven screen, the openings of which are small enough to retain the gravel, yet provide ample drainage. Note closed bull plug on bottom, and the two wall scratchers and pipe guides immediately above it.

jobs due to freezing wash pipes inside the liners. Operators were licensed under this patented process.

Greater success was attained by using cement-lined perforated casing with a few perforations open just above the shoe of the liner. It was found that with this method, when circulating pressures were increased to a certain point due to the resistance to the passage of fluid through the gravel column building up outside the liner, the cement lining would break at some point above the top of the gravel. When the gravel had built up to the point of break, circulating pressures would again increase until the cement lining again failed.

Difficulties arose under these circumstances due to inability to control the point of failure of the cement lining. At times, when failure occurred a considerable distance above the top of the gravel, the hole bridged before being completely packed. In other cases, perforations in the liner were cut out due to continued passage of fluid through a few slots, allowing gravel to return to the surface with the circulating fluid and making it impossible to complete the job.

One operating company which has made extensive use of circulated gravel packs with good results in single zone wells, has developed a technique in which the wash pipe is equipped on the bottom with an assembly of swab rubbers several feet long and is continually raised as the gravel builds up outside the liner so that the swab rubbers, which force the reverse circulation to pass outside the perforated liner, are always at or near the top of the gravel.

Following is a detailed description of equipment and operations used in this method. The liner described here is 4¾-inch packed in a hole underreamed to 13-inch diameter. Recently a number of wells have been completed with 4-inch liners in 11½-inch holes. Seven-inch water string is set at the top of the zone and after obtaining a water shut-off 6⅝-inch hole is drilled to the bottom of the zone. The open hole is scraped to 13 inches from the 7-inch casing to within about 5 feet of bottom, the lower 5 feet being reamed only to 10⅝ inches in order to center the liner. Four-and-three-quarter-inch O.D. liner perforated with 10 rows of 2-inch 60-mesh slots on 6-inch centers is made up, consisting of sufficient pipe with API threads and collars on bottom to reach up to just below the 7-inch shoe and above this sufficient pipe with flush-joints to reach approximately 200 feet above the 7-inch shoe. The 4¾-inch liner is all perforated except 25 feet at the top of the liner and 25 feet just above the 7-inch casing shoe. Four pieces of spring steel are welded to the 4¾-inch liner and flared out upward at a point which will be just below the 7-inch shoe when the liner is landed on bottom so as to engage the 7-inch casing shoe in case the wash pipe or swabs become tight and tend to pull the liner from the hole. The blades of spring steel are strong enough to hold the liner against a reasonable pull but could be easily sheared off by jarring if it were desired to pull the liner at any time.

A California-Texas type shoe on the bottom of the 4¾-inch liner contains a female left-hand square-thread connection below which is a float valve which permits circulation down through the drill pipe but will not permit reverse circulation. All joints in the 4¾-inch liner are spot welded to prevent backing off. When the liner is made up, sufficient 3½-inch O.D. flush-joint drill pipe is made up to reach from the shoe to above the top of the liner. On the bottom of the drill pipe is a left-hand square-thread nipple to fit the left-hand connection in the shoe of the liner. Immediately above the left-hand nipple is a set of circulating jars which permits vertical movement of the left-hand nipple while making up or backing off the left-hand connection. Immediately above the jars a series of 6 4-inch swabs spaced at approximately 2-foot intervals is welded to the wash pipe. The top 4 swab cups are in an upright position

and the lower 2 are inverted. The purpose of these swab cups is to force the circulation out around the outside of the liner.

After the liner is made up, the drill pipe is run into the liner and the left-hand nipple screwed into the left-hand threads in the shoe. A steel bonnet at the top of the liner, about 5 feet over all, and 4¾-inch O.D. liner has a 1-foot sleeve on the bottom which fits snugly inside and above this a shoulder to set down on top of the liner. A circular opening through the bonnet permits the 3½-inch O.D. wash pipe to move up and down freely while a packing ring inside this opening prevents circulation or gravel passing down inside the liner. After the liner and wash pipe are made up, the bonnet is secured to the top of the liner with shear pins which will fail under a load considerably less than the weight of the liner.

The liner and wash pipe are run in and landed on the bottom of the hole on 3½-inch O.D. external upset drill pipe. The wash pipe is backed out of the connection in the shoe of the liner and pulled up several feet. In placing the gravel, reverse circulation is established down the outside and up through the wash pipe. Twin hoppers are used for introducing the gravel into the circulating fluid. The two hoppers consist of cylindrical containers with openings at the top into which gravel may be dumped. They are cone shaped at the bottom and 2-inch pipes connect the bottom of the cylinder with the lines from the pump discharge to the casing head. By-pass lines leading into the top of each cylinder permit by-passing part of the fluid from the pump through the cylinder for the purpose of jetting the gravel into the mud line leading from the pump to the casing head. Stop cocks are installed on the gravel inlet at the top, the outlet at the bottom, and the by-pass line into the cylinder so that one can be filled with gravel while the other is feeding gravel into the mud stream and thus gravel may be added continuously. Each hopper holds 6 cubic feet of gravel.

With the wash pipe hanging a few feet off bottom, circulation is established down the outside and up through the drill pipe and the mud equalized and checked as to condition. The rate of pumping fluid is adjusted at 15 cubic feet per minute and gravel is introduced at the rate of 0.75 cubic feet per minute. Circulating pressures under these conditions on various jobs have varied from 125 to 300 pounds per square inch. When the gravel reaches the bottom of the hole and builds up to a sufficient height around the liner to reach above the swab cups on the bottom of the wash pipe, there is a noticeable increase in pump pressure (usually 10-30 pounds) caused by the fluid passing out around the swabs and through the gravel. The wash pipe is then raised 5 or 10 feet and kept in this position until the gravel again builds up above the swabs when the pipe is again raised. This process is continued as gravel is circulated into the hole at a steady rate. Thus the swab assembly is kept at about the top of the gravel.

When it is necessary to lay down a joint of drill pipe in raising the swabs, the introduction of gravel is stopped, the circulation is slowed down, and the joint is layed down without stopping circulation. When the circulating head with hose leading to the ditch is replaced on the drill pipe circulation rate is again adjusted to 15 cubic feet per minute and introduction of gravel is again started. When the top of the gravel outside of the 4¾-inch liner reaches the shoe of the 7-inch casing, there is a marked increase in circulating pressures (generally about 100 pounds). When the gravel builds up around the blank section above the 7-inch shoe, a further substantial increase in pressure will be noted if the swabs are pulled into the blank section since this forces the circulation to pass through the 25 feet of gravel outside the blank pipe.

Usually, if gravel has been added continuously up until the time when the top

Wall cleaning casing guides are placed on the end of each joint. In the case shown, two guides are employed. These serve dual purpose of cleaning sand face, and centering pipe in hole. Ample space is provided on pipe for guides to move instead of buckling over inside casing, each time drill pipe is raised at table to remove slips.

After liner is hung in the table, a string of 2½-inch wash pipe, having a perforated interval plus two sets of inverted swab rubbers on the lower end, is lowered into the liner. Following setting of liner hanger, wash pipe is raised from bottom, washing each foot of hole thoroughly.

of the gravel reaches the 7-inch shoe, there will be sufficient gravel in the descending mud column to fill the remaining 200 feet between the 7-inch and 4¾-inch. Accordingly, addition of gravel is stopped at this time and after circulating a sufficient length of time to get all gravel to bottom, the swabs are pulled into the blank section at the top of the liner. If this causes a large increase in pressure it shows that the gravel has reached this blank section and that packing of the liner is complete. Following this, the wash pipe is pulled up, the shear pins holding the bonnet at the top of the liner are sheared off, and the swabs pulled above the top of the liner. Circulation is established down through the drill pipe and continued until all excess gravel is recovered.

Sometimes there is sufficient gravel in the descending mud column when the top of the gravel reaches the 7-inch shoe to fill considerably above the top of the 4¾-inch liner. In this case, a marked increase in pressure is noted and the drill pipe tends to bind when raised or lowered. When this happens, the bonnet is immediately sheared off the top of the liner and the excess gravel circulated from the hole with the swabs above the liner.

On most of the later jobs in which 4-inch O.D. liners have been packed in 11½-inch holes, special spring-type casing guides made of drillable material have been used to center the liner. These guides can be milled up in case it is desired to wash over and recover the liner.

The fluid used as a circulating medium has an important effect upon performance of gravel-packed wells. In general, results have shown that when oil is used as a circulating medium, initial productivity is considerably greater than in comparable wells in which mud is used.

Although it would seem desirable to use a thin mud with high colloidal and low solid content, Wilmington wells, taking special precautions in mud treatment and conditioning prior to gravel packing, have not had noticeably greater productive rates than other gravel-packed wells. This is thought to be due to the fact that the packed gravel holds the filter cake in place so that even if it is very thin it is not removed by washing.

It has been common practice to thoroughly wash gravel-packed wells with water if mud is used to place the gravel. However, as stated before, it is believed that this is not effective in removing the filter cake from the walls of the hole.

The effect of the mud filter is apparently enough to more than counteract the increase in productivity to be expected in liners gravel packed in underreamed holes. The theoretical amount of increase is indicated by Hill[3] and Sage and Lacey[4] to vary up to a maximum of 50 percent depending on the thickness and permeability of gravel surrounding the liner.

While those wells gravel packed with oil as a circulating fluid seem to have better initial productivity, comparative data are not available to determine whether these wells actually have greater productivity than they would have had with conventional liners.

Installations Inside of Original Liners

Circulated-gravel packs and prepacked liners have been used inside of original liners to prevent excessive sand production. Although successful in preventing sand entry, the majority of such installations have resulted in excessively low production rates as compared to other wells. This is believed to be due mainly to the limited area of effective perforations in the outer liner.

Wells in which liners are washed and reperforated before installing the inside gravel pack have performed better than those in which no such precautions were taken.

A number of wells in which such installations have been made have already declined to uneconomic rates. In most cases, the additional cost of a redrill job would be more than justified by the

longer economic life and higher rate of recovery to be expected.

Choice of Gravel Size

Relationship of gravel size to the diameter of the grains of sand in the producing formation has been the subject of exhaustive research. Gumperts[1] and Coberly and Wagner[2] arrived at a relationship expressed in terms of the ratio of the largest gravel grains to the sand grain size at the 10-percentile point on the cumulative grain analysis curve. Gumperts recommends a ratio of 11 and Coberly and Wagner state that the ratio may be 13, but recommend use of gravel not more than 10 times the sand diameter at the 10-percentile point on the cumulative analysis curve. Hill[3] cites the case of a certain gravel chosen on the basis of Coberly and Wagner's rule being used to screen two sands with the same size at the 10-percentile point but with an otherwise entirely different range and distribution of grain sizes. One sand was satisfactorily screened while the other was not.

Hill suggests that other factors relating to distribution of grain sizes might yield more positive results in determining gravel size but states that exhaustive analysis would be necessary to derive a positive rule and recognizes that only in very rare cases has a gravel 10 times the 10-percentile sand-grain diameter failed to screen sand.

Sage and Lacey[4] have presented a detailed resume of experimental work and mathematical analysis of the screening effect of gravel in which a method for choice of gravel size is outlined. In it are considered all variables including the physical properties of the fluids to be produced, anticipated velocity, thickness of gravel pack, geometric pattern of the arrangement of the gravel particles as reflected by the porosity of the gravel pack, and the range and distribution of sand grain sizes.

Velocity of fluid movement and viscosity of fluid have a direct effect on the sand-carrying capacity. Most of the experiments employed greater velocities than are common in Wilmington wells but used fluids of much lower viscosity than the heavy crude which is produced in those areas presenting the most serious sand problems.

Experience in Wilmington wells has demonstrated that sand entry is practically eliminated in all cases where the ratio of maximum gravel diameter to the 10-percentile sand-grain diameter is 12 or less. The finest sand encountered in most Wilmington wells has a grain diameter at the 10-percentile point of about .015-inch. Gravel sizes used most commonly in prepacked liners are .093- to .131-inch and .131- to .187-inch. One manufacturer has standardized on .070- to .110-inch gravel and one operator has installed a number of liners packed with .078- to .093-inch gravel. Recently a number of liners have been packed with .187- to .270-inch gravel. This size is designed to permit the entry of small amounts of sand into the well with the purpose of minimizing the plugging action which apparently takes place at the outer periphery of the gravel. This practice is discussed elsewhere.

In gravel-packed wells the most common gravel diameter used is .131- to .187-inch; some wells have been packed with .093- to .131-inch gravel and several of the early jobs used ¼- to ⅜- or ½-inch gravel. Those wells packed with this coarse gravel (more than 3/16-inch) have produced sand to some degree but have experienced much less difficulty than the average well with conventional liner.

Production performance of gravel packed wells will be discussed in the second installment of this article.

A circulation-type liner hanger facilitates washing and conditioning of the prepacked liner. Clean water, circulated down the wash pipe, washes through the gravel sheath, then up face of sand to the lower hanger ports. Here it passes through interior of hanger, emerging again above lead seal, and on up through casing annulus to surface.

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[2] C. J. Coberly and E. M. Wagner, "Some Considerations in the Selection and Installation of Gravel Pack for Oil Wells." AIME Tech. Pub. No. 960. August, 1938.

[3] K. E. Hill, "A Study of Some Factors Affecting the Screening of Unconsolidated Sands by Gravel in Wells." Thesis for Master of Science in Petroleum Engineering, University of California, 1940.

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Wartime Suggestions
FOR OIL PRODUCERS

To ASSIST oil producers in solving some of the problems and headaches with which they contend as a result of the war, PAW has issued a bulletin in which ideas and suggestions that will help in making the most of material already on hand are published.

To avoid waste of time, paper and money, PAW asked oil companies to limit their requests for copies of the bulletin, and any that may be published subsequently, to those men who are in a position to make use of the ideas described. Feeling that it can help reduce time, paper and money, and also give widespread distribution to the suggestions, THE OIL WEEKLY herewith publishes PAW's first issue, Bulletin No. 1 of "Suggestions for Oil Producers During the War." Subsequent issues of similar bulletins prepared by PAW that pertain to producing, drilling and pipe-line problems will be published by THE OIL WEEKLY.

Saving Materials by Proper Selection of Casing and Tubing Strings

IMPORTANT savings of material can be made in oil-well casing and tubing strings by selecting the minimum, practicable sizes and weights. For instance, one operator recently made application for some 9000 feet of 26-pound, 7-inch casing, including 2000 feet of N-80 casing. At the suggestion of PAW analysts, the application was changed to 8000 feet of 17-pound, 5½-inch J-55 pipe and 1000 feet of 17-pound, 5½-inch N-80 pipe. a total saving of 41 tons of steel was made by this one change (including 18 tons of grade N-80 steel, which has become increasingly critical.)

Another operator saved 76 tons of steel by changing his application for 51,000 feet of 17-pound, 5½-inch pipe to an equivalent length of 14-pound, 5½-inch pipe. Such savings in material accomplished by careful casing and tubing selection, reserving the use of larger sizes, heavier weights, and higher grades of pipe for instances when they are absolutely necessary, will enable more wells to be drilled and equipped with the same amount of material.

Particular attention should also be given to the use of smaller tubing strings as, for example, the substitution of 2-inch instead of 3-inch tubing whenever this is practicable and the same consideration should be given to conserving steel by installing smaller size pipe in flow lines, lease lines, etc.

Automobile Engines for Production Use

BECAUSE of the incipient shortage of oil-field power units, the wider application of new and used automobile engines in the oil fields is being encouraged by PAW.

Although oil-field power units have been specially designed to obtain desirable speed and power characteristics, the use of automobile engines for many purposes is entirely feasible.

The most important mechanical disadvantage of using automobile engines is that the power takeoffs are not as simple and compact, but in some instances the multiple-speed and reverse features will be actually helpful.

The cooling system of some engines will have to be enlarged because the radiator is less efficient under the reduced air circulation that prevails when the engine is operated as a stationary rather than a mobile unit.

Shop-Made Butane Vaporizers and Carburetors

MOST factory-made butane vaporizers combine a heating element (heat from engine cooling water) and a regulator that reduces the pressure yet maintains a relativeily high-pressure feed (5 to 8 pounds). The fuel is then fed to a special butane carburetor, which vaporizes the butane for engine use.

A gasoline or natural gas carburetor can handle butane vapor but not at the higher pressure; to function effectively, these carburetors must be fed with fuel vapor at not more than a 12-oz. pressure. The necessary heating and pressure reduction to attain this lower pressure can be done by stages without materially sacrificing efficiency.

The usual factory-made vaporizer heating element is a single water-immersed copper coil that may be duplicated under stress of the present emergency in shop-made assemblies.

Small regulators are hard to obtain and regulators not designed for butane are prone to freeze if the feed to them is not heated. It is for this reason that factory assemblies have regulators included integrally with the vaporizers.

Conversion of Gasoline Carburetors so That Gas May Be Used as Fuel

GASOLINE engines in field use are generally converted to gas for oil field use and particularly so when used for production lease work. Such engines are of a type that can utilize gasoline, gas, or butane satisfactorily provided that proper carburetors are employed so that effective vaporization of the fuel takes place.

Gasoline-natural gas carburetors are becoming harder to obtain. As a satisfactory makeshift, any gasoline carburetor can be made into a fairly efficient gas carburetor by brazing or tapping a small gas connection into the carburetor intake on the air side of the butterfly valve. The gasoline fuel line should be provided with a cock as should the gas line. The motor can be started easier on gasoline and the switch to gas can then be made gradually after the engine is running.

Prestressed Reinforced Concrete Storage Tanks

THE need to conserve steel suggests the use of non-critical materials in the construction of small tanks whenever conditions will warrant the substitution. The use of concrete suggests itself in the construction of water storage tanks, tanks for fuel oil and other liquids having low vapor pressures, and other types of storage normally constructed of steel.

The following excerpt is from a letter dated July 2, 1942, to Max B. Miller, Refining Division, Office of Petroleum Coordinator, from S. S. Johnson, Jr., The M. W. Kellogg Company, Jersey City, New Jersey:

"You are undoubtedly aware of the concrete storage tanks now being built by the Preload Company, 47-48 Fifth Street, Long Island City, New York, consisting of a prestressed reinforced concrete tank, in which the concrete is thrown into compression by pulling up horizontal steel circumferential rods in the reinforcing to a predetermined initial stress. The tank walls are formed by gunite and the prices are fairly well

in line with steel tankage for atmospheric pressure. On a recent defense job, which we are building requiring large gas holders, we are using these concrete tanks for the water seals of the holders. The tanks are 150 feet in diameter and approximately 36 feet high. It is my understanding that a similar type of tank is being used by Imperial Oil Limited for fuel oil storage in Halifax and that Standard Oil Company of New Jersey is familiar with the design. These tanks were recently put into operation, and I am told that they are tight and appear to be entirely satisfactory. In the case of the water tanks which we purchased for the gas holder seals, we saved approximately 750 tons of steel plate in two water tanks, with some plate ranging as thick as 1¼ inches. The reinforcing steel required is only about 25 percent of this.

"It was at the suggestion of the Ordnance Department, Office of Ammunition Production, Wilmington, Delaware, that we investigated these tanks in an effort to conserve heavy plate."

Using Available Tankage Effectively

A REVISED survey by one company of its tankage led to the elimination of three 140,000-barrel tanks, each equipped with floating roofs, which were at the moment being fabricated.

Steel plate for steel tanks is particularly difficult to obtain. Steel tanks consume more plate than does any other part of the equipment needed for most petroleum industry operations. It is suggested that a thorough study of tanks available be made in connection with all proposed work in order to see if available tankage cannot be made suitable without the necessity of ordering more plate.

Radial Type Manifold Requires Less Material

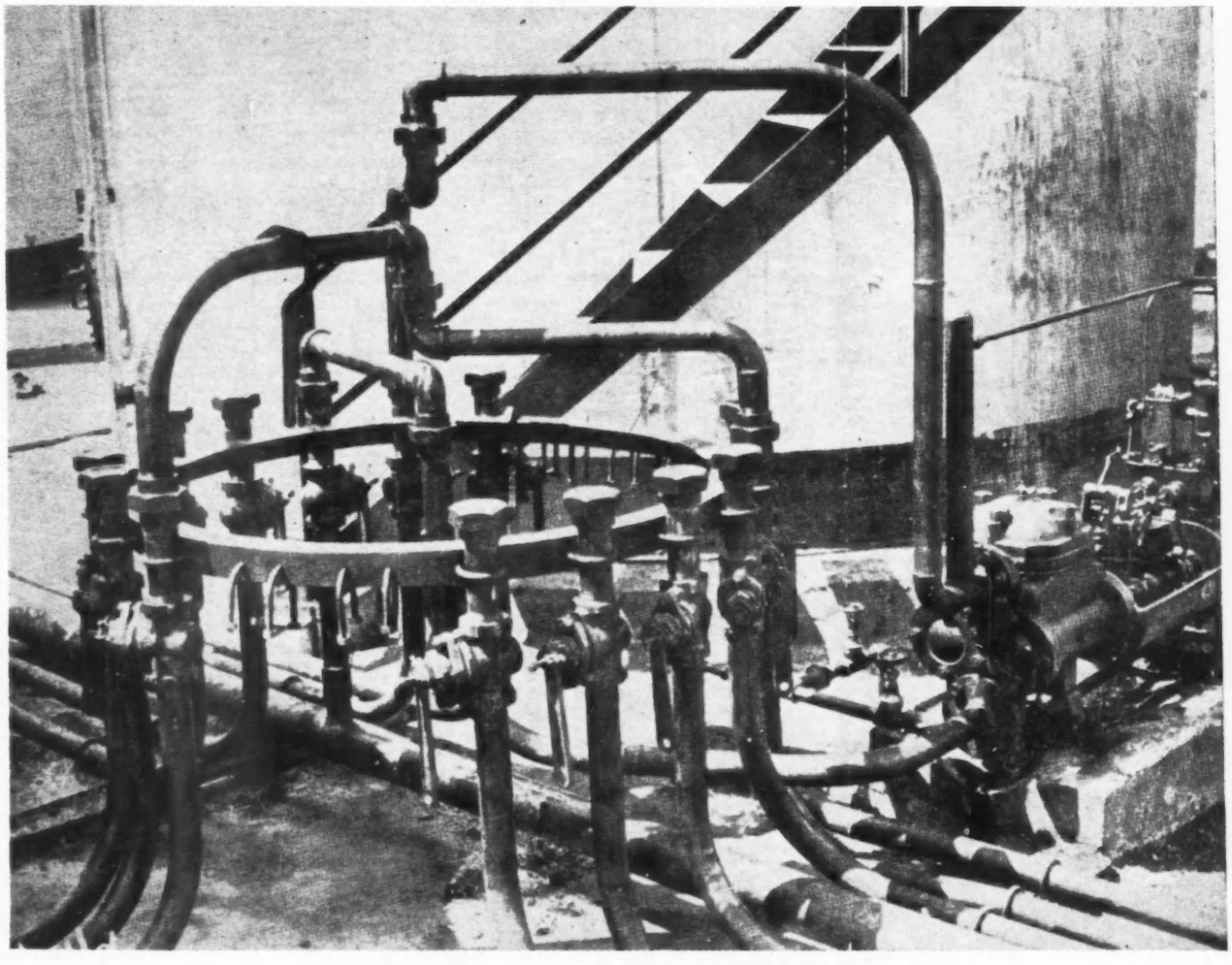
ATTACHED is a print of a photograph showing a radial type manifold developed by Standard Oil Company of California, which may be of interest.

This type of manifold has been in service for several months and has proved to be very practical. It possesses a number of advantages over the ordinary square type blinded manifold. Some of these advantages follow:

1. Several operations may be conducted over the manifold simultaneously. These operations are accomplished by installing one or more crossover connectors between pairs of spots on the manifold or the washing of lines, without interfering with the manifold pump connections.

2. Less material is required. On a radial manifold only one valve is required per line instead of two. The hook-up of connectors is apparent at a glance so that rising stem valves are not necessary. Also, if one connecting line to a square manifold handles stocks requiring an alloy valve, every valve in the manifold has to be of that material, whereas with a radial manifold only those lines carrying the stock require the special valves.

3. Valve servicing and replacement cost are reduced because there are only



Radial type manifold developed by Standard Oil Company of California.

half as many valves. If corrosive stocks are being pumped, only the valves on the lines carrying the corrosive stocks are subjected to the corrosion.

4. Less time is required for lining up the radial manifold for pumping because it is simpler to break unions than to change blinds in crowded locations.

5. Lines can be added or removed and valves serviced with little difficulty because individual lines can be worked on without disturbing the rest of the manifold.

There are many other possible variations, such as the use of flanged valves in larger pipe sizes and other modifications, some of which are in use.

Production Can Take the Cue From Refining in Utilizing Compressors on Hand

GENERAL Petroleum Corporation, at Torrance, California, Magnolia Petroleum Company at Beaumont, Texas, Phillips Petroleum Company at Borger, Texas, and Shell Oil Company at Wilmington, California, have each reported that they were able to take care of practically all their compressor requirements by utilizing spare compressors located within their own organization. Shell Oil Company took care of part of its compressor load by adopting absorption refrigeration. One hears a great deal these days about the manner in which centralized control is destroying rugged individualism. It is a subject upon which this office is unfitted to comment. However, when it comes to building war plants within petroleum refineries, it is quite noticeable that the industry as a whole still recognizes the fact that the good Lord seems to continue to help those who help themselves.

Valves and Fittings

VALVES and fittings promise to be one of our most serious bottlenecks. Cast iron valves should be substituted for steel valves wherever possible, and particularly in the smaller sizes. The elimination of alloys in valve bodies will help the situation materially. The practice of prefabrication and/or the welding of the pipe should be carried to the extreme.

Second Hand Gasoline Engines

HIGHER preference ratings are steadily being asked by manufacturers of internal combustion engines. From all appearances, it will soon be necessary to employ some of the thousands of idle used automobile engines for various types of oil-field power. These engines are readily convertible to natural gas or butane, although at present there is a shortage of conversion equipment, such as gas carburetors, butane vaporizers, etc. If possible, the engines should be permitted to continue utilizing gasoline as fuel, to aid in reducing the stocks of low-octane motor gasoline that will accumulate as a result of nationwide mileage rationing.

Welding Rod

ONE of the most critical materials is welding rod. The War Production Board has recently issued Conservation Order L-146 covering its allocation. In connection with this order they have made certain recommendations which should be strictly adhered to. They are reproduced as follows:

"1. Every electrode must be burned to the end of the coating.

"2. Short sections of rods must be fused together so that all rods are consumed in their entirety.

"3. No electrodes shall be bent unless it is absolutely necessary to do so to reach an inaccessible point if such bending will damage the coating.

"4. Operators must use the largest diameter electrode possible for any given type of work.

"5. All miscellaneous maintenance and repair work shall be done with dust coated, dipped, and border line factory rejects electrodes unless it can be proven that such grades of materials cannot possibly be used."

Adjusting Field Carburetors

A COMMON mistake in operating gasoline engines on natural gas is to adjust the air-gas ratio to high and the excess air soon burns up the valves. This is difficult to prevent if the adjusting equipment is not well designed but the following practice should be followed in case of doubt. At rated speed, increase the gas until the engine chokes and runs unevenly and then gradually decrease the gas until the engine "levels out" and again runs smoothly, thus insuring a rich enough mixture.

Used Drill Pipe

BECAUSE of the critical shortage of alloy metals and the increasing needs of the armed forces for alloy carbon steels, PAW is encouraging operators to make maximum effective use of their drill pipe by resale of used drill pipe to operators whose needs do not require new pipe.

By employing available services for inspection of interior wall surface of the pipe and by rebuilding worn tool joints, much pipe that is no longer safe for deep drilling can be adapted to many shallow drilling programs.

Interior wall inspection will pay for itself alone in reducing the number of fishing jobs and the lost time and expense involved in such jobs.

In many cases where operators have suspended operations they are willing to sell their rigs as a unit but hesitate to part with individual parts of the rig such as drill pipe, drill collars, reamers, and corebarrels, and other equipment items that are difficult to obtain on early delivery dates, if at all.

Greater emphasis is being placed by the war command on the necessity for scrapping all idle equipment for which essential use is not foreseen within the immediate future. Because portions of stacked rigs are needed on rigs that are in operation even though the idle rig as a whole may not be required, it is suggested that owners of stacked rigs should begin offering to make available specific equipment items from their idle drilling rigs.

If used tubular goods are to be transferred from one operator or contractor to another, approval of the transaction must be obtained on Form PD-470 as required by Priorities Regulation No. 13. If used equipment is bought from a supply house dealer or jobber, it is not necessary to apply for preference rating or to conform with Regulation 13. Steps are being taken to remove petroleum industry materials from the requirements of Regulation 13 but for the time being it is necessary to comply with the order.

Power Pumps

MANY secondary recovery and salt water disposal projects are being proposed by operators in various parts of the country. As a result the demand for small power pumps of all sizes has greatly increased. All such sources of this equipment must be thoroughly canvassed if the needed number of the units is to be obtained.

Saving Materials in Water-Flood Operations

A REPORT has recently been received from a company that engages in extensive water-flooding operations. By removing casing from water-input wells, the reclaimed material is made available for re-use in producing wells. The following quotations are from the report:

"In the present all-out war, it is of vital importance that industry should conserve as much steel as possible.

"In the Bradford field, there is one very simple, practicable means by which considerable saving in the consumption of steel can be accomplished.

"The Bradford field produces its

crude oil by means of secondary recovery methods. The particular method is known as the 'Five-Spot' method because of the similarity of the well pattern to the fives on a pair of dice. The four corner wells are water-input wells and the well in the center of the square is the producer.

"The average amount of steel in the form of casing that is required to equip one water-input well is as follows:

42 ft of 8¼-in, 17.5-lb casing..... 735 lbs.
370 ft of 6¼-in, 13.0-lb casing....4,810 lbs.
Total .....5,545 lbs.
or 2.77 tons.

"Since the beginning of water flooding, it had been the custom of the field in general to leave the casing in the water-input wells, in addition to the installation of 1½-inch or 2-inch tubing through which the water is injected.

"For the last five years, our company has been pulling the casing in the water-input wells. Inasmuch as the tubing string is cemented adequately at its lower end and is not retrievable, there is no real need for the casing string, once the input tubing has been installed and the well is in operation. This was tried out as an experiment to develop more economical operations and proved so successful that the procedure has been continued. It has been found that 80 percent of this casing could be reclaimed. The remaining 20 percent is lost because it either cannot be pulled or is damaged to such an extent in pulling that it cannot be re-used. The casing reclaimed from water-input wells is then used in the producing wells where it remains permanently.

"As a result of this practice, our company has not had to buy any 6¼-inch casing; only a small amount of additional 8¼-inch casing has been reqiured during the last several years.

"Converted into weight, the saving in net steel reclaimed and re-used amounts to 2.22 tons per well.

"During the last twelve months approximately 1500 water-input wells have been drilled in the Bradford field. In 375 wells on which our company has data and in which the casing was removed, a total saving of 832 tons of steel was effected. If the casing had been removed in the other 1125 water-input wells drilled, an additional 2498 tons of steel could have been saved, or a total of 3330 tons.

"In water-flooding operations in Oklahoma and Illinios in which our company is interested, even greater savings in materials have been effected. It was found that in these fields the producing wells, instead of being pumped, could be flowed, thus saving 4.62 tons of steel for every producer drilled.

"The break-down of this additional saving is as follows:

Central Power 700 lbs.
Engine ..... 500 lbs.
Total .....1200 lbs.to each 20 producers.
Pull rods ..... 600 lbs.to each producer.
Sucker rods ... 375 lbs.to each producer.
Pumping jack. 500 lbs.to each producer.
450 ft of 6⅝-in, 20-lb casing, or 9000 lb, 80 percent reclaimed.
500 ft of 1½-in, 2.75-lb tubing instead of 2-in, 4-lb, tubing or 625 lb, 80 percent reclaimed.

"In addition to the above, considerable saving is effected in other critical materials such as galvanized iron, etc., used in the construction of power houses.

"Flowing the producing wells has been tried in the Bradford field but with little or no success. This additional saving cannot, therefore, be applied to this field."

Turning in Used Stainless Steel Pump Parts

THE following is quoted from a letter mailed November 11, 1942, to 25 manufacturers of ball-and-seat pump assemblies by H. M. Kent, Chief, Salvage Section, PAW, Washington:

"Stainless steel being one of the materials deemed most critical by the War Production Board, efforts have been made to develop substitutes for it. While such substitutes may be adaptable in many instances, there are commodities to which they are not suitable. Among these are the stainless steel balls and seats used under certain conditions in the plunger type pumps for lifting oil. However, stainless steel is not available under the present war program to supply sufficient amounts even for this purpose.

"This letter is being sent to all manufacturers of balls and seats as it has become necessary that the petroleum industry and manufacturing companies participate in a program of collecting these particular articles, thereby assisting themselves in obtaining this critical material . . .

"From a partial survey of manufacturers and operators, we have reached the conclusion that such a program should suceed if worn balls and seats are delivered to agencies of the manufacturers, who would in turn route them to the mills for remelting. When this has been accomplished, PAW can better demand an allotment of stainless steel from the Iron and Steel Branch, of the War Production Board, to fulfill demands for this essential use.

"In the foregoing we have sketched a suggested program designed to make available to the manufacturer the material now contained in worn balls and seats. The manufacturer, occupying a pivotal position in the manufacture and distribution of these products, could and should undertake the collection and routing of these worn parts; of course, with such assistance as PAW might appropriately provide.

"Would you kindly reply at your earliest convenience, giving us your view with respect to this undertaking; and will you participate with other manufacturers in this program?"

If the supply houses get together and develop a plan whereby they will undertake to collect stainless steel parts, the cooperation of all operators will be desirable. If these critical, scarce alloys can be kept segregated from other types of steel scrap and be returned to the steel mills as such, it will go a long way toward assuring that new stainless steel pump assemblies will be available. There is hardly a pumper's shack or field office in the country that hasn't at least one ball and seat serving as a paper weight and it is important that these be gathered up and made available for remelting.

Cooperate by turning in worn stainless steel parts.

Consolidation of Lease Equipment

ALL present indications point to even a more critical shortage of production materials and equipment next year. It will become increasingly important for all operators to look at their "hole card" on materials and to revise, revamp, substitute, reclaim, consolidate, in fact, do any and all things that will result in present equipment being used as effectively as possible.

Except in rare instances, the layout and location of gathering lines, tank batteries, and other lease facilities follow no broad pattern. Unavoidably, the layout on a given lease or group of leases "mushrooms" or, like Topsy, "jest grows." When a field is flush, lines and tanks must often be larger than is necessary after the wells decline. In normal times, an operator, although recognizing that the set-up is over-sized, may be reluctant to go to the expense of rearranging the facilities.

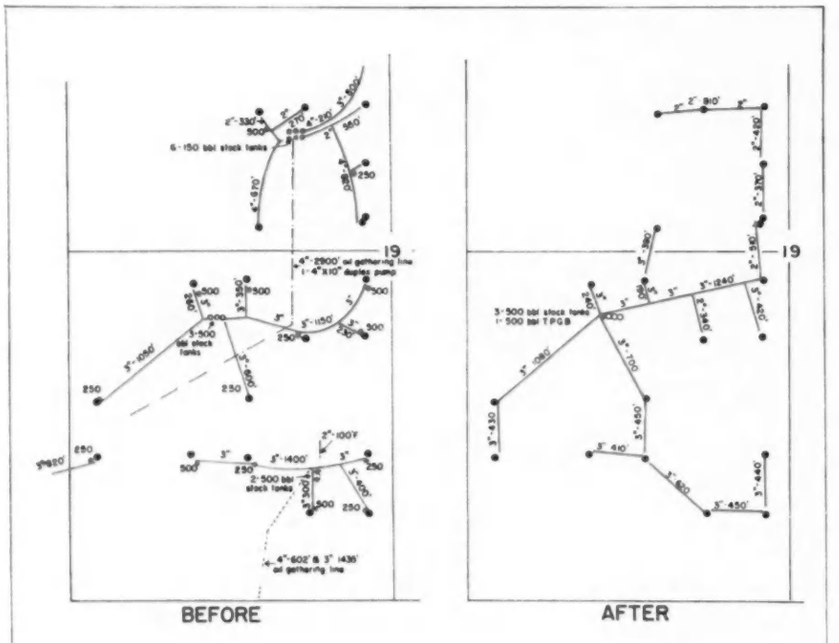
These are far from normal times, however. We are in a war and materials are scarce. It will pay operators, and PAW is urging them, to study every detail of their lease layouts to determine how much equipment can be dispensed with and used elsewhere, without impairing operations. Not only look at their own leases, but talk it over with the operators on adjoining leases to see if a pooling arrangement can be worked out. Joint use of facilities is the order of the day, and all operators are urged to give the subject close study and attention.

As an example of what can be ac-

complished by revamping lease-line layouts and relocating tank batteries, the following case is cited:

An operator in a once-flush field has, down through the years, acquired many of the leases that formerly were under diverse ownership. Each lease had its own gathering system, bearing no relationship to the adjoining leases, and these various layouts had been permitted to stay as they were, rather than to go to the expense of changing them. But that was before the war began and materials became so scarce. In recent months, the operator of these leases has undertaken a major revamping program, involving the use of a relatively small amount of new mateiral in order to reclaim an impressively large quantity of tanks, pipe, fittings, and other materials, most of which was reusable but part of which helped swell the nation's supply of steel scrap, which is needed so urgently in the war program.

The total program comprised 13 "projects," three of which are shown in the accompanying sketches. The layouts "before" the work was done are typical of lease layouts in many fields throughout the country. The layouts "after" the facilities were streamlined indicate some of the advantages to be derived from a revamping program. Where lines had previously rambled around the leases, there is now geometric simplicity. Where tanks had previously been installed at each well to accommodate flush production, the few remaining tanks are now concentrated in centrally located lease batteries. Of course, elimination of tanks, whereby individual well potentials can be gauged, may not be possible in some fields or in certain states, but as much along these lines should be done as possible.



Two examples of how rearrangement of lease lines and relocation of tank batteries saved critical materials.

The total program of 13 projects resulted in taking out of service and reclaiming for use elsewhere the following materials and equipment:

Steel Tanks:
3—100-bbl. (bolted)
2—100-bbl. (riveted)
12—150-bbl. (welded)
22—200-bbl. (bolted)
2—200-bbl. (riveted)
185—250-bbl. (bolted)
59—500-bbl. (bolted)

265—Total number of tanks.

Line Pipe (from flow lines):
2-in.— 730 ft. (2,738 lb.)
3-in.—7,535 ft. (60,085 lb.)
4-in.—7,484 ft. (82,324 lb.)

Valves:
424—2-in. valves (5,090 lb.)
149—3-in. and 4-in. valves (5,660 lb.)
20—2-in. and 4-in. check valves (850 lb.)

Altogether, therefore, a total of 265 tanks and 78 tons of pipe and fittings was made available from properties owned by the operator undertaking the program. In addition thereto, by consolidating with adjoining operators, the following items were reclaimed from the other operators' leases:

Line Pipe:
2-in.—10,831 ft. (43,300 lb.)
3-in.— 6,255 ft. (50,000 lb.)
4-in.—21,657 ft. (238,000 lb.)
6-in.— 1,192 ft. (22,800 lb.)
Total (354,100 lb. or 177 tons)

Boilers:
22—from which the flues will be used to repair remaining active boilers. Estimate 150,000 lb. (75 tons) of scrap after removing usable material.

Quoting from the operator's report on this program:

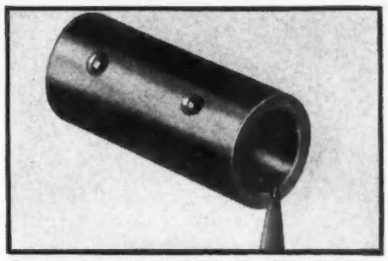
"In addition to the above, these consolidations will release a considerable amount of pipe-line equipment, consisting of pumps, electric motors, wiring, fittings, and corrugated iron pump houses. We do not own this equipment and do not have a complete inventory of it nor do we know of the exact disposition to be made under the proposed rearrangements. However, it will be released to the pipe line companies for uses elsewhere.

"Since the present system is old and in need of repairs, it will be necessary to replace some of the check valves by purchasing new ones. The steel from the salvaged tanks will be available for making repairs to existing tanks, erection of other tanks where needed, and

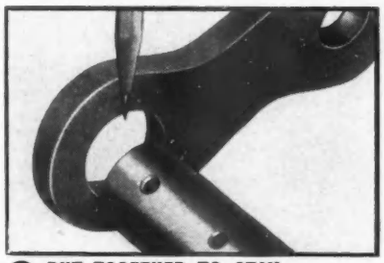
"I'M GOING TO TAKE THIS LINK APART AND SHOW YOU WHY REX IS THE TOUGHEST OIL WELL CHAIN!"

1 IT TAKES A GREAT CHAIN to take the punishment of oil well service and I say that any Rex oil well chain *is* great. The saying is "Rex will give you the lowest cost per foot of hole on any well." I'll take this link of Rex Deepwell apart and show you why . . .

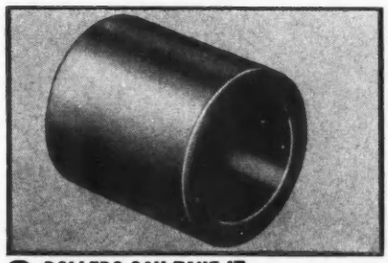
2 WE'LL START WITH BALANCE—These pin and bushing holes are different size but the side-bar ends are balanced against each other. The heat-treated alloy steel pin is balanced with the alloy steel heat-treated side-bar. There's balance that gives greater strength.



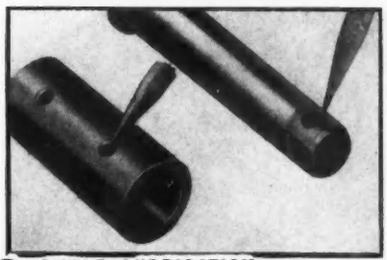
3 HERE'S WHERE THE WEAR COMES—Abrasion of steel meeting steel occurs between the inside of bushing and outer surface of pin. In this Rex chain bushings are seamless alloy from solid stock, case-hardened, ground inside and out. Less abrasion, more resistance, longer life.



4 PUT TOGETHER TO STAY—Rex uses a force-fit assembly in seating the bushing in the side-bar. Side-bar holes are finished smooth so that they won't work loose. No rocking pressure can pull Rex chains to pieces. It's put together right.



5 ROLLERS CAN TAKE IT—These rollers are seamless alloy steel, heat-treated for toughness and the right degree of hardness. This construction assures longer life. Wear takes a long time to start on the smooth-finished surfaces.



6 AMPLE LUBRICATION—The Rex lubrication system provides a protective coat of oil for all working surfaces. Oil holes in bushing (left) are always in position to lubricate the chain. The 3-diameter pin (right) makes link replacement simple.

You've just seen the part-by-part story of a great oil chain belt, one of over 2000 types and sizes of chain belts for transmission of power, movement of material and timing operations. Remember that REX is "the chain that gives you the lowest cost per foot of hole."

REX OIL WELL CHAINS

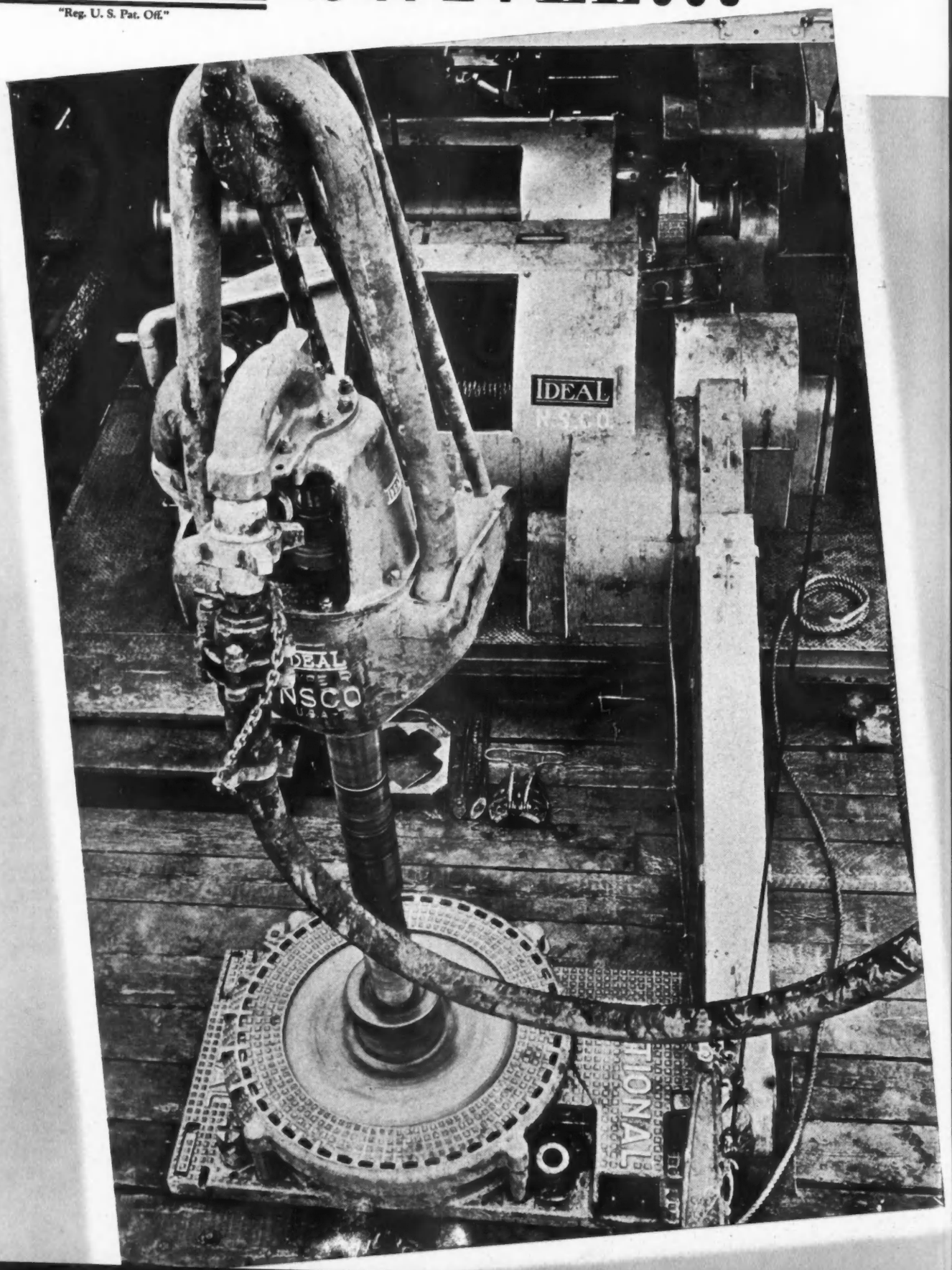
REX CHAIN BELT COMPANY OF MILWAUKEE

Rex Conveying and Engineering Products Division, Rex Chain Belt and Transmission Division, Milwaukee, Wisconsin • Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts; Worcester, Massachusetts

REX CHAIN BELT COMPANY

TAKE CARE OF YOUR IDEAL SWIVEL...

"Reg. U. S. Pat. Off."



...IT IS MOST ESSENTIAL IN PROVIDING THE HUGE VOLUME OF OIL NEEDED FOR WINNING THE WAR

Increase the life of your Swivel by observing the following:

- ☆ **Flush out oil reservoir occasionally and fill with clean lubricant.**
- ☆ **Feel the swivel body frequently...in case of overheating, remove from service for inspection.**
- ☆ **See that wash pipe packing is properly installed. If wash pipe is scored, replace it.**
- ☆ **Do not use a crooked kelly...it is very liable to cause injury to the swivel radial bearings.**
- ☆ **Occasionally give swivel a good, general inspection. Replace worn parts before trouble develops.**
- ☆ **Follow general instructions from the manufacturer.**

Main Bearing of an IDEAL Swivel

THE NATIONAL SUPPLY COMPANY

Executive Offices: Pittsburgh, Penna. • General Sales Office: Toledo, Ohio • Division Offices: Fort Worth, Texas; Tulsa, Okla.; Torrance, Calif. EXPORT: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2, *Limited Liability.*

that not otherwise usable will be scrapped.

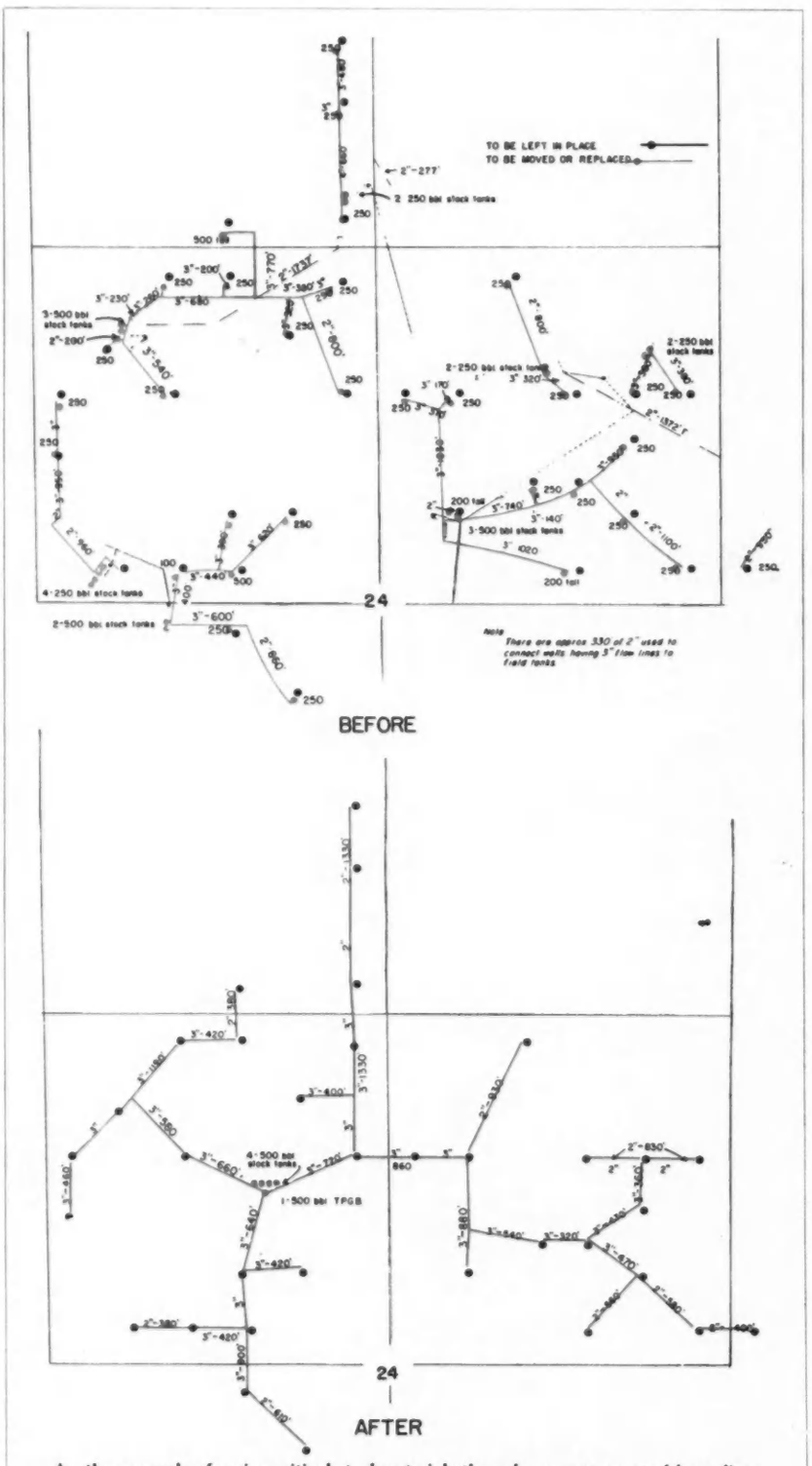
"The materials requirements for these proposed consolidations appear in Table 1.

"The purpose of these 13 consolidation projects is to improve our operations in this field and to salvage a large amount of the equipment in the existing installations for use elsewhere. Only a small amount of new material is necessary for these projects and the material to be salvaged amounts to 265 steel tanks and approximately 330 tons of iron and steel material in pipe, fittings, and boilers. Because of the amount of material to be salvaged, and the small amount of new material necessary, as well as the more efficient operation of the field to be obtained by these projects, we believe that the work is completely justifiable in the best interest of the Nation's War Program.

"The tank batteries and lines in the present system were originally installed during the flush stages of production with extensions being made from time to time as occasion and necessity arose. Just recently these properties have been unitized, thereby eliminating the necessity for separate gauging of oil in the various tank batteries. In an effort to maintain these properties in good working condition, to obtain more efficient operation, and to salvage critical material, we have made plans to consolidate the tank batteries and oil flow lines wherever possible."

TABLE 1

ITEM	Source	Weight,[1] Lbs.
88—2-in. all iron check valves	Will purchase—new	1,288
6—3-in. plug valves	Will purchase—new	198
Electric welding rod	Will purchase—new	230
10—No. 3 Robertshaw Thermostats (copper and brass) (30 lb.)	Will purchase—new	.....
Tank Bolts	Will purchase—new	2,500
Rubber tank gasket material (1,275 lb.)	Will purchase—new	.....
Total iron and steel requirements		4,216



Another example of saving critical steel materials through rearrangement of lease lines and relocation of tank batteries.

Moving and Redesigning Tanks

PHILLIPS Petroleum Company recently moved four 64-000-barrel cone-roof tanks from Seminole, Oklahoma, to Kansas City and changed these tanks to floating roofs. This procedure cost more than new tankage. It saved, however, 1500 tons of steel plate.

Steel: Plate, Structural, Sheet

BECAUSE the industry has been obtaining a fairly even flow of steel plate, it would appear that the impression has gotten about to the effect that the steel battle has been won. Such is not the case. Steel is still a problem. It is not merely a matter of rolling, shaping, and fabricating steel; it comes right down to ingot production. Curtailment in the use of steel is the best way of solving the problem.

Well Completions of 1942 34 Percent Under 1941

Fairly well in line with the program of drilling laid down by the government, well completions in the United States in 1942 totaled 21,217, or 34 percent less than the 32,217 recorded for 1941, preliminary statistics reveal. The government program called for 19,000 wells, or 40 percent less than in 1941.

Least affected by the drilling curtailment program were the Appalachian states.

In the Middle West and upper Mid-Continent, drilling was curtailed 25 to 50 percent. Kansas had 28 percent fewer completions in 1942 than in 1941, and other decreases included those of 34 percent in Oklahoma, 32 percent in Indiana, 46 percent in Illinois, 36 percent in Ohio, 50 percent in Kentucky, 25 percent in Michigan.

In the Southwest, New Mexico showed the smallest curtailment of development, completions of 1942 having been only 3.5 percent less than those of 1941. Arkansas was down 32 percent in total completions, North Louisiana 40 percent, South Louisiana 44 percent, Mississippi 50 percent, and Texas as a whole 50 percent. Within Texas, decreases above the state average were recorded for North, Eastern, and South Central Texas, while other districts of the state showed decreases between 40 and 50 percent.

California completed 27 percent fewer wells in 1942 than in 1941, Colorado 28 percent less, Montana 23 percent less, and Wyoming 29 percent less.

STATE OR DISTRICT	TOTAL RIGS IN OPERATION (Drilling, Rigs Up, Shut Down)				DETAILS OF JANUARY 1, 1943 FIELD ACTIVITY					
					Rigs in Operation			Prelim. Activity		
	Year Ago, Jan. 1, 1942	Month Ago, Dec. 1, 1942	Now, Jan. 1 1943	Percent Change From Year Ago	Drilling	Rigs Up	Shut Down	Derricks	Locations	Total Operations
Alabama	6	2								
Arkansas	30	26	17	—43.3	13		4		3	20
California	297	207	205	—30.9	125	40	40		97	302
*Colorado	23	30	26	+13.0	5	1	20			26
Florida	2	3	3	+50.0	2		1			3
Georgia	2		1	—50.0	1					1
Illinois	377	248	257	—31.8	185	30	42		40	297
Indiana	67	44	53	—20.8	43	5	5		27	80
Iowa		1	2		1		1			2
Kansas	235	194	177	—24.6	146	18	13	8	28	213
Kentucky	39	38	54	+38.4	49	5			10	64
Louisiana	234	105	111	—52.5	88	9	14	12	74	197
North Louisiana	92	25	38	—58.6	26	3	9	3	9	50
South Louisiana	142	80	73	—48.5	62	6	5	9	65	147
Michigan	172	124	95	—44.7	53	7	35	14	23	132
Mississippi	28	8	13	—53.5	12	1				13
Missouri	8	9	9	+12.5	2	1	6			9
*Montana	76	77	75	— 1.3	35	5	35	2	3	80
Nebraska	22	23	22		13	1	8		2	24
New Mexico	124	77	66	—46.7	40	3	23	1	15	82
New York	125	131	130	+ 4.0	64	25	41		2	132
Ohio	295	250	244	—17.2	186	16	42	17	42	303
Oklahoma	302	244	231	—23.5	188	25	18	4	28	263
*Oregon		1	1		1					1
Pennsylvania	403	372	287	—28.7	201	25	61	17	60	364
*South Dakota	1	1	1				1	1		2
Tennessee	7	2	3	—57.1	1	1	1		1	4
Texas	1,346	590	607	—54.9	458	54	95	37	247	891
E. Tex. Border Counties	10	3	9	—10.0	9				1	10
East Texas Field	9									
Rest of Eastern Texas	75	33	27	—64.0	16	3	8	5	8	40
North Texas	169	106	104	—38.4	77	7	20	4	83	191
West Central Texas	80	51	61	—23.7	46	2	13	2	11	74
West Texas	385	185	204	—47.0	146	23	35	7	36	247
Texas Panhandle	150	49	47	—75.3	38	7	2	1	12	60
Gulf Coast, Upper	132	45	49	—62.8	40	3	6	5	37	91
Gulf Coast, Lower	185	74	66	—64.3	56	4	6	5	29	100
Southwest Texas	92	27	27	—70.6	20	3	4	5	21	53
South Central Texas	59	17	13	—77.9	10	2	1	3	9	25
*Utah	4	3	3	—25.0	2		1			3
West Virginia	311	88	52	—83.2	37	6	9	3	9	64
*Wyoming	49	64	58	+18.3	38	5	15		2	60
Total United States	4,585	2,962	2,803	—38.8	1,989	283	531	116	713	3,632

* Data for January 1, 1943, subject to slight revision.

State or District	MONTHLY COMPLETIONS										CUMULATIVE COMPLETIONS: YEAR 1942									
	Total			Details for December, 1942							Total			*Details for Year 1942						
				New Wells Drilled for Oil or Gas					Old Wells Drilled Deeper	Total Footage Drilled				New Wells Drilled for Oil or Gas					Old Wells Drilled Deeper	Total Footage Drilled
	Year Ago, Dec., 1941[2]	Month Ago, Nov., 1942[3]	Latest Data (Dec. 1942)[1]	Oil	Gas	Distillate	Dry	Others[6]			1941[4]	1942[5]	Percent Change	Oil	Gas	Distillate	Dry	Others[6]		
Alabama											5	3	—40.0				3			4,697
Arizona			1				1			3,000		3					3			9,662
Arkansas	10	12	4	3			1			26,405	185	127	—31.3	80		2	45			781,538
[7]California	74	84	85	75			10			264,314	1,118	816	—27.0	566	8		224		18	3,478,610
Colorado	3		1				1			4,527	21	15	—28.5	6	1		8			71,800
Florida		1									1	1					1			2,640
Georgia											1	2					2			6,519
[8]Illinois	341	[9]185	162	109	1		48		4	393,971	3,935	2,122	—46.0	1,178	12		809	32	91	5,251,800
Indiana	54	28	24	6	2		12		4	35,532	546	375	—31.3	126	19		208		22	610,978
Iowa											6									
Kansas	190	138	113	46	3		58	2	4	353,672	2,217	1,603	—27.6	835	79		615	12	62	4,926,851
Kentucky	31	28	14	6			8			28,333	335	169	—49.5	69	2		91	2	5	260,679
Louisiana	154	75	45	30	2		13			289,595	1,557	906	—41.8	582	39	7	278			6,017,898
North Louisiana	81	43	22	15	1		6			81,255	702	425	—39.4	271	25	3	126			1,753,784
South Louisiana	73	32	23	15	1		7			208,340	855	481	—43.7	311	14	4	152			4,264,114
Michigan	107	60	33	15	1		17			78,510	885	666	—24.7	308	76		281		1	1,686,655
Mississippi	7	6	3				3			14,331	198	100	—49.4	35			64	1		530,740
[10]Missouri	8	3	1				1			384	85	35	—58.8	1	6		28			23,567
Montana	43	12	7	6	1					14,559	250	193	—22.8	126	46		21			425,947
Nebraska	8										93	28	—69.8	11			16		1	66.072
New Mexico	50	25	27	16	2		8		1	79,290	397	383	— 3.5	260	12		104		7	1,090,218
New York	172	125	91	60			1	30		117,459	1,119	1,228	+ 9.7	711	6		9	502		1,611,034
Ohio	168	123	98	16	38		43		1	245,319	1,774	1,134	—36.0	235	510		359	7	23	2,674,126
Oklahoma	207	102	138	47	15		54	6	16	398,362	2,162	1,428	—33.9	600	93		555	33	147	4,294,627
[11]Pennsylvania	308	286	218	103	16		9	90		377,215	3,944	3,845	— 2.5	1,802	285		111	1,620	27	6,433,355
[12]Tennessee	1		1				1			2,130	23	9	—60.8	1	2		6			14,370
Texas	1,016	353	269	130	18	1	115	3	2	1,162,200	10,439	5,163	—50.5	3,139	166	51	1,634	49	124	21,439,150
E. T. Border Co.'s	2										33	12	—63.6	4	5		3			65,806
East Texas Field	14	1									513	17	—96.6	10			6	1		58,123
Rest of East Texas	69	30	23	13			10			119,147	570	385	—32.4	227	18	7	133	4	6	1,901,255
North Texas	230	68	53	27			25	1		178,352	2,462	905	—63.2	391	5	1	424	39	45	2,361,879
West Central Texas	66	24	28	4	4		18	2		54,327	645	363	—43.7	134	22		193	2	12	791,198
West Texas	272	83	56	42			13		1	247,024	2,365	1,386	—41.3	1,126	13		200		47	5,802,114
Texas Panhandle	85	21	20	10	9		1			63,315	708	367	—48.1	277	63		20		7	1,102,840
Gulf Coast, Upper	59	27	30	12	1	1	16			202,175	742	441	—40.5	264	17	6	153	1		2,990,812
Gulf Coast, Lower	122	54	32	18	4		9		1	168,989	1,304	772	—40.7	497	25	36	208	1	5	4,589,264
Southwest Texas	67	33	19	3			16			96,313	808	407	—49.6	179	6	1	218	1	2	1,448,104
South Central Texas	30	12	8	1			7			32,558	289	108	—62.6	30	2		76			327,755
Utah											3									
Virginia												1		1						1,113
West Virginia	101	85	69	16	41		9		3	196,663	774	764	— 1.2	118	494		99		53	2,234,421
Wyoming	14	9	3	2	1					11,719	137	98	—28 4	78	5		13	1	1	368,824
Total United States	3,067	1,740	1,407	686	141	1	413	131	35	3,097,490	32,210	21,217	—34.1	10,868	1,861	60	5,587	2,259	582	64,317,891

* Preliminary: subject to minor revisions. [1] Wells completed in 4 weeks, or 28 days, ended December 26, 1942. [2] Wells completed in 4 weeks, or 28 days, ended December 27, 1941. [3] Wells completed in 5 weeks, or 35 days, ended November 28, 1942. [4] Wells completed in 52 weeks, or 364 days, ended December 27, 1941. [5] Wells completed in 52 weeks, or 364 days, ended December 26, 1942. [6] Water input, gas injection, and salt water disposal wells. [7] California figures from A.P.I. except for December, 1942. [9] Illinois statistics for November revised to embody State Geological Survey data on new wells. [10] Figures from Missouri Geolcgical Survey. [11] Bradford and Kane-Clarendon, Pennsylvania, figures from The Producers Monthly. [12] Figures from Tennessee Division of Geology.

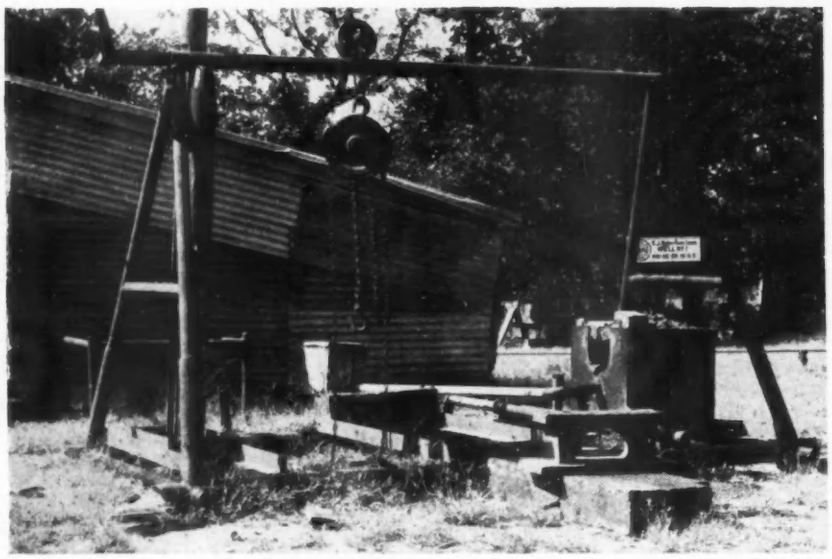
PRACTICAL OPERATING *Hints* FOR

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston,"

1. *TOOL DRESSING*

Portable Forge Aids Clean-out Operations



Utilizing scrap materials, readily transported forge and convenient rail and hoist permit quick set-up and reconditioning of all types of tools required for jobs of short duration.

DURING clean-out operations, cable tool operations are usually of short duration and operators are not able to fix up in the manner that they would for a long job.

The portable forge shown, which was constructed from junk pipe and angle irons, has proven itself very useful for such jobs and is lots easier to move.

The runners were welded out of 4-inch line pipe with the legs and cross member of 3-inch line pipe. Six pieces of old derrick angle iron were welded across on top of the 4-inch runners, one set holding the forge itself, another set holding the anvil and back-up block, and the third set holding a slack tub. A chain hoist is swung from the cross member by means of a traveling pulley.

The forge was made up out of old tank steel and lined with fire brick, the back-up block is made from an 8x10-inch piece of timber, with holes bored for 2x3-inch and 2¾x3¾-inch pins. The anvil can slide back and forth in the angle irons for various length bits, and on extra long bits, can be blocked up away from the runners. The slack tub is made out of a piece of 15½-inch casing and is set in the angle irons so that it can be removed or turned bottom side up when the tools are stacked. Pieces of chain with hooks are welded on the legs to hold the bits in place when they are standing in the slack tub. The gas and air lines are welded to the runners and the blower and gas mains are attached by means of unions.

This arrangement has proven very useful and easy to use as well as having the advantage of being unitized.

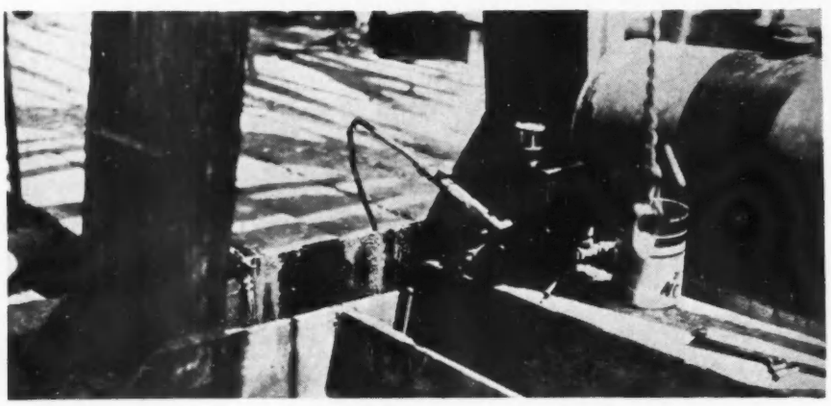
2. *CHEMICALS*

Lubricator Serves As Emergency Feeder

INABILITY to secure the desired feeder for introducing chemical into the flow line failed to prevent one operator from taking the necessary steps to reduce the emulsion being produced.

An old gas engine lubricator, of the single-pump, impulse type, was salvaged and mounted on a heavy timber as working base, with the former oil lead tied in to a copper tubing connecting with the flow line. An extension arm on the usual driving mechanism of the lubricator was hooked to the pump beam with a section of chain, a counterweight being provided to insure quick return of the drive for the next operating cycle.

Continuous feed into the sump of the lubricator is obtained by mounting a drum of the desired treating chemical alongside, with a pipe and regulating valve tying the two together. Since the lubricator works on the positive displacement principle, no flooding is possible even if there is a slight gravity head on its sump.



Weighted arm and flexible hook-up to well beam provide drive for powering single-pump impulse-type engine lubricator direct-connected to drum of chemicals for treating flow from well.

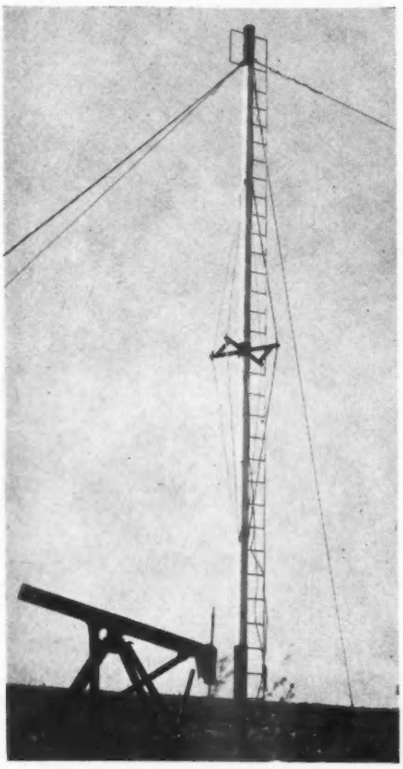
3. *WELL SERVICING*

Trussed Casing Mast Handles Shallow Units

SINGLE pipe masts are usual servicing equipment in shallow areas where the load is not excessive and where overstresses from paraffin accumulations are not anticipated.

Due to the difficulty of securing fab-

THE PRODUCTION MAN



Welded cross-arms, carrying sucker-rod braces, add required stiffness to 45-foot portable unit.

ricated masts for this service, many operators are working out and putting together designs of their own, and thus maintaining their wells in producing condition.

One company has been making masts 45 feet in length from 7- or 8-inch casing, which are capable of pulling up to 2700 feet of 2½-inch EUE tubing full of fluid. The bracing shown prevents center buckling, insuring axial stresses during the entire period of the lift.

Four pieces of 2½-inch tubing, each two feet in length, are welded to the center of the mast at right angles to each other, the ends being slotted to allow a sucker rod to be carried in the aperture. Cross pieces of 2-inch pipe are welded between the tubing "X" on the sides only, to allow clearance for the lines.

Sucker rods, usually ⅞- or 1-inch, are placed in the slots and carried along the mast and welded there. This bracing is sufficient to give the mast the desired rigidity, a ladder at one side providing access to the masthead.

4. *ROD LINES*

Line Support Timbers Protected by Shelters

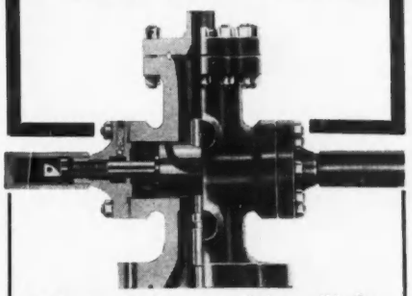
THE value of providing weather protection for creosoted timbers on the lease is well illustrated by the rod-line posts set outside a band-wheel pumping power installed in the old Burkburnett field in 1912.

These timbers, bored diagonally to provide maximum rod support, were set in the ground at the proper height, the top being cut to a peak by 45-degree cuts from each side, leaving a narrow flat strip atop. Over this peak was tacked a weather shield of light galvanized metal, wide enough to project an inch or so beyond the sides of the post, and extending two inches down along the vertical sides of the post.

Such shields prevent entry of water into the end grain of the post, and have repaid the initial cost many times over by the extended life thus assured the timber posts.

Tapering tops to the posts, fitted with formed shields of galvanized metal, provide proper drainage and in this instance have extended timber life over 40-year operating period.

RECTOR
ROUND RAM
TUBING HEAD



Tubing may be suspended on (1) the rams, by means of a special recessed tubing coupling, threaded for back pressure valve; (2) on mandrel in bowl above rams; (3) on slips in bowl above rams. In some areas a stripper may be used to run tubing with the rams in the open position. Your composite catalog has complete details.

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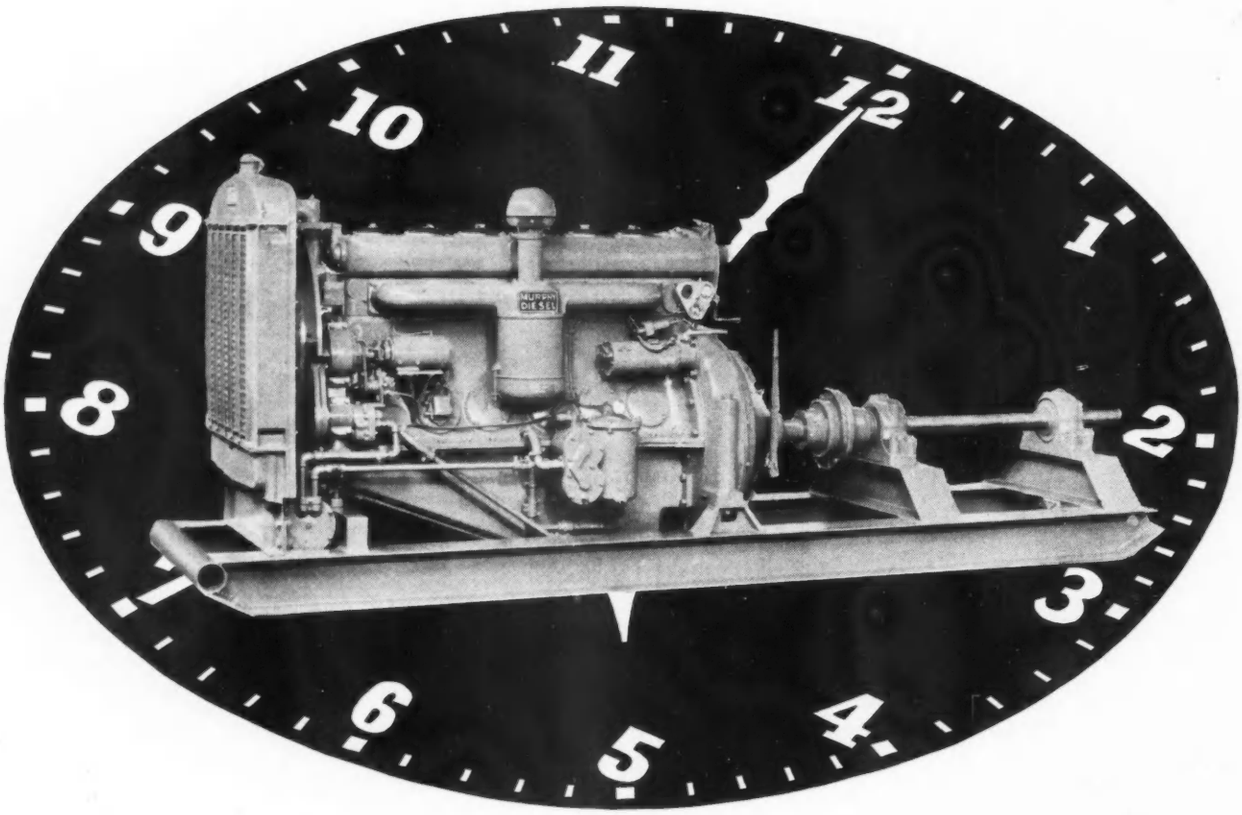

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☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

TACITLY admitting that their whole effort to maintain the Eastern oil supply had bogged down hopelessly, government officials concerned with oil last week were forced to the final expedient of cutting rations ruthlessly to keep war industries going and give householders a modicum of heat.

Chronologically, OPA on January 2 ordered a cut of 10 percent in the value of all heating-oil coupons, and on January 7 prohibited all pleasure driving and made a further cut of 25 percent in heating-oil rations for non-residential structures.

That even further sacrifices might have to be made was acknowledged in an OPA statement in connection with the ban on non-essential driving that "even more serious measures were being drafted to be ready for immediate use if the current situation gets worse."

At the capitol, even before the new Congress convened, an investigation of the situation was started by the Senate oil committee, but Chairman Maloney admitted that it did not appear possible to increase deliveries immediately and that prospects were remote for restoration of the cuts.

East Fuel Ration Cut Despite Cold; Stop Pleasure Driving

»

PIWC Finds No Hope for East Despite Larger Deliveries

»

Investigators Told Third Big Line to East May Be Needed

»

By B. F. LINZ
Washington Correspondent

☆ ☆ ☆ ☆

Meeting for its first 1943 session, PIWC also took a pessimistic view of conditions, its committee on petroleum economics unable to foresee any improvement over even a period of months.

Eastern Fuel Ration Cut Ten Percent; Public Buildings Must Convert to Coal

Still staggering from the double blow of a 60-hour ban on gasoline sales and a general 25-percent cut in the value of gasoline coupons, Easterners got another touch of what Sherman said war is, in the shape of a 10-percent reduction in the gallon value of fuel-oil coupons coupled with a warning that the worst may be yet to come.

Ordered in the midst of a cold snap in the middle of a winter already 20-percent colder than last year, the cut in rations did nothing to soothe the lacerated feelings of citizens who did not know from day to day whether they would get any gasoline for their cars but had already learned from hard experience that they might have to wait anywhere up to 10 days to get their oil tanks refilled.

The cut was part of a three-way OPA move to deal with the situation, other phases of which were the announcement that traveling salesmen in the East would not participate in the additional gasoline rations to be given such workers generally and an order to ration boards throughout the 30-state area to cut off oil supplies from apartment houses, hotels, theatres, office buildings and other commercial structures which can convert from oil to coal but fail to do so by the end of the month.

The fuel-oil cut will save 30,000 to 40,000 barrels a day, but will mean maximum temperatures of 60 degrees for many homes and may mean practically no heat for many of poor and leaky construction which, under the much-critcised OPA formula, got no more oil than did homes of the most modern type.

No Pleasure Driving

By mid-week OPA appeared to be almost in a state of panic, preparing to slash rations drastically to cut demand to meet supply.

The first step was a ban on pleasure driving by the holder of any type of gasoline ration book, with cancellation of rations prescribed as the penalty for failure to comply, but at the same time the agency was reported to be readying a further cut in the heating oil allowable for theatres, office buildings, stores and other non-residential consumers which would cut them to 50 percent of their normal use of oil, and PAW was said to be drawing up a list of least-essential activities, from which all supplies could be cut off if the emergency deepened.

The demoralizing failure of the administration to cope with the oil problem of which it had been given ample warning served to focus the attention of the new Congress on the war-agency setup and increased the criticism of "bureaucracy." As the session opened Representative Manasco of Alabama introduced a bill to prohibit federal agencies such as OPA from requiring periodic inspection and registration of automobile tires, and Congressman Voorhis of California submitted a measure barring employment of "dollar-a-year" men by the government.

In announcing the ban on non-essential driving, OPA officials made it plain that even more serious measures were being drafted to be ready for immediate use if the situation gets worse.

"The simple facts are these," Administrator Henderson said. "The combination of demand from our armed services and our civilian population are draining the Eastern reserves of petroleum products at a pace more rapid than our overburdened transportation facilities can replenish them. The measures taken over the past week were forced upon us by circumstances of war. Failure to act swiftly and boldly could only mean serious threat to war production in the East, a breakdown of vital transportation, and tens of thousands of homes utterly without heat.

"There simply isn't enough fuel oil or gasoline to go around."

Henderson said that while an appreciable amount of gasoline will be saved by curtailing A book pleasure driving, the chief abuses have been found to stem from the non-essential driving of holders of B and C rations "who either have exaggerated their needs or are not fulfilling the car-sharing plans they outlined to procure the rations originally."

Coincidentally with its new restrictions on gasoline, OPA began a drive to clean up the "black market," with arrests which it was said cleared up the theft of books for 1,000,000 gallons from a Washington ration board.

Convicted of illegal possession of coupons, a Washington service station operator was sentenced January 8 to one year in jail and a fine of $2000, indicating that the courts will cooperate in the drive. The operator got off easy, however, since the maximum sentence meted him could have been four years in jail and a fine of $40,000.

A few hours later, Henderson ordered a 25-percent cut in heating oil rations for non-residential structures, reducing their allotments to approximately 45 percent of last year's consumption.

The following day he issued an official definition of "pleasure driving," which prohibited anything other than essential operation and warned that OPA inspectors had been instructed to check on cars at places of amusement. Racetracks in the South and road resorts all through the East began immediately to fold up. Their patronage wiped out, theatres in the small communities dependent upon the surrounding country for patronage found their audiences diminished, and in the overcrowded defense centers, transportation companies already overburdened,

staggered under additional passenger loads.

Louisiana Raises OPA Ire

Taking time out from studies of the general situation, the Price Administrator traded blows with Louisiana's Governor Sam H. Jones in old-time Henderson style, charging the state executive with attempting to undermine and destroy the administration of measures which the government has determined to be essential to victory.

Cause of Henderson's outburst was a letter from Jones to U. S. Goodman, state OPA administrator, charging that "the Eastern interests have imposed gasoline rationing in the states of plentiful gasoline" and urging that "common sense" be substituted for Washington's regulations. Louisiana, the governor said, has "the greatest percentage of essential workers and our gasoline allowance should, therefore, be greater per capita than any other state in the nation."

"Your assertion that the situation in Louisiana is so different from that of the Eastern rationed area as to render the Eastern solution 'impossible' for Louisiana is arrant nonsense," Henderson declared.

"Your letter, with its innuendo that gasoline rationing will fail in Louisiana if the rationing plan is adhered to, together with your statements that gasoline rationing is unfair to the people of Louisiana and was imposed by 'Eastern interests,' constitutes direct encouragement to violation of the regulations. Disregard of established law can never be in the best interests of government or the war effort. It is shocking, therefore, in the midst of war, to find the chief executive of a great state counsel such action on the part of loyal citizens and volunteers.

"Only if you have information that proves the Baruch report wrong, or if you know of a yet undisclosed source of rubber, will it be possible to grant extra rations of gasoline to Louisiana. If you have such information and will make it available to the public, the entire country will be indebted to you for rendering a real service in the winning of the war. But if you have no such information, your letter can be regarded only as a tragic disservice to the people of your state and to their sons who are fighting abroad."

Senate Investigators Told Eastern Relief May Require Third Big Line

A third pipe line from the producing fields to the Atlantic seaboard may have to be laid if the gasoline and fuel-oil needs of Eastern civilians are to be met with any assurance, Administrator Harold L. Ickes told a Senate committee at the opening of the first 1943 Congressional investigation of the situation, January 4.

Ickes told the committee, headed by Senator Francis Maloney of Connecticut, that he still hopes to get oil moving through the first leg of the big-inch line next month, but the link to the coast will not be completed before June.

The line will help to relieve the situation, he said, but added he could not see "any hope of relaxing gasoline rationing and not more than a very small fuel-oil relaxation."

"It's going to be a tight pull until March 1, when the weather should offer some relaxation," he added.

Products Line

The application for the products line which is to parallel the big-inch crude oil conduit is now pending before WPB, he explained. The application calls for a 20-inch line, but the project may be changed over to 24-inch pipe, the additional cost of which, he said, would not be significant.

"Whether those two will meet the need we don't know," he told the committee. "We may come along in a few weeks and suggest a third pipe line if we are to be dead sure of supplying the need for petroleum products here and the requirements of the Army, which are going to be accelerated from now on."

The recent wash-out of the Mississippi crossing will not delay operation of the first link of the big line, the administrator said, explaining that priorities have slowed up procurement of valves, so that the break probably will be repaired and the crossing completed by the time the valves, some of them 8½ tons in weight, are in place.

Significantly, he revealed that retiring Price Administrator Leon Henderson has been a consistent supporter of the pipe-line program from its very start, and at one time was the only man on the Supplies Priorities and Allocations Board who did support it.

At the outset of the hearing, Chairman Maloney expalined it was the desire of his committee to help and not merely to bring out deficiencies in the program or its administration. The hearing, he said, was designed to get the views of the officials concerned with the problem—Ickes, Henderson, Rubber Director Jeffers, Transportation Director Eastman and Maritime Commission Chairman Land—and will be followed by studies of various phases of the situation.

Cars Break Down

Discussing the Eastern transportation problem, Ickes told the committee that the recent decline in rail deliveries was not unanticipated, but admitted that some of the set-backs which have been encountered were not foreseen. To considerable extent, the latter were due to the elderly condition of tank cars and the breakdowns which keep 14 percent of them in the shops.

Currently, he said, 1,000,000 barrels a day is being brought into the area as against a combined military and civilian demand for 1,500,000 barrels. Every effort is being made to bring in as much heating oil as possible, even at the expense of gasoline, but "when all is said and done, we are living on a hand-to-mouth basis and we are going to continue to live on a hand-to-mouth basis."

The administrator disclosed that the Army and Navy are cooperating in meeting the situation, and the former is furnishing 200,000 drums for the shipment of oil in box cars which carry supplies to the southwest and normally return empty.

He also revealed that by strenuous efforts, New England is being supplied with 120 percent of the gasoline it had last year, but there is some suspicion that hoarding is taking place and that some persons are "cheating" by using their kerosene cook stoves for heating purposes.

Ickes declared that by next winter the tank car situation may have become serious because of the deterioration of the cars and said a program is badly needed for the building of new cars, not only as replacements but also to augment the fleet.

Under questioning by Chairman Maloney, Ickes admitted he did not have all the power he would like to deal with the situation, but refused to particularize what additional authority would be advisable. He pointed out that it "took 100 days battle" to get the power he now has and said, "I believe it best to let old sores heal" before driving for additional strength.

Bad in Middle West

The fuel-oil situation in the Middle West is bad because of the withdrawal of tank cars to move oil to the East, but conditions in Oregon and Washington, while "tough" are not as bad, he told the committee.

Answering questions propounded by Senator W. Lee O'Daniel of Texas, he said that the inland waterways have not been overlooked in planning for additional facilities, and Major Parten, chief of the PAW transportation division, explained that the present program will increase direct deliveries by barge into District 1 from 132,000 to 200,000 barrels a day, with greater increases in deliveries into District 2 which will release rail cars for the Eastern movement.

Parten explained that power units are the limiting factor in barge development, saying that it took five to six times as much horsepower to deliver long-haul oil by barge than by other methods. The program, he said, contemplates the conversion of 239 steel barges from dry to oil cargo and the building of 500 wooden barges, which will increase barge capacity by some 2,000,000 barrels.

Foreign Representatives

Ickes revealed that PAW has a man in England to watch the oil situation there, and will soon have a man in Mexico and others in Latin America. The London man is George S. Walden. He was selected by Ickes, who told the committee, "Walden is a 'top-notch' man," but is actually employed by the State Department, which has control of all oil shipments abroad for civilian use.

Winding up his testimony, Ickes told Senator Harold H. Burton of Ohio, in response to a question as to whether relaxation of fuel-oil restrictions was to be anticipated this year, that "I think we have to face the grim fact that there will be a tightening up of supplies before there is a relaxation."

In fact, the administrator indicated, conditions next winter may be worse

than they are now, for there may be a shortage of coal as well as of oil.

It all depends on military demand, he said.

Other officials who appeared before the committee had little to add to what they have said at previous hearings.

Henderson said that the cut in civilian supply has been one third in fuel oil and 60 percent in gasoline, and that a survey is now being made of industrial uses with a view to securing economies in that field.

The retiring administrator told Senator Burton that the December 18 "blackout" on gasoline sales in the East was precipitated by an unforeseen sudden military withdrawal of oil, combined with bad weather, heavy pre-Christmas freight and passenger loads, a heavy mail movement and "everything that would interfere."

At the time, he explained, the new activities of PAW had not been fully organized, but from now on it is expected that Ickes will be able to figure for such withdrawals under the plan whereby PAW certifies to WPB the available supply for a given period, to compile which it is to receive information regarding probable requirements for the various claiming agencies.

Henderson was critical of the failure of the industry and the public itself to submit information of possible evasions of rationing regulations, and said the public has accepted oil rationing less willingly than that of anything else.

"Not Tough Enough"

To some extent, he thought, this is due to a lack of recognition of the seriousness of the situation. "As an outgoing administrator," he said, "my regret is not that I have been as tough as I have been painted but that I have not been tough enough."

Rationing procedures can and are being simplified, Henderson said.

Jeffers laid before the committee a letter he has written to Henderson and Eastman, urging simplification of regulations for farmers, both as to gasoline and other oil products they use, on the ground that food production is as important to the war as production of munitions. All of the farmer's oil needs should be given him "in one package," he said.

The rubber director disclosed that he now has perfected his organization, and while the synthetic program is about 30 days behind schedule it will catch up by midsummer if the necessary priorities are granted by WPB. However, he said, there is a difference of opinion between his office and the military authorities over the granting of priorities.

Jeffers took the position that if he was given what he wanted, he would get "out of the way" of tank, airplane and other construction, lend-lease and other activities and the Army and Navy could go ahead with their programs. But the priorities should not be delayed, he maintained, because rubber is going from a test-tube in the laboratory to large-scale commercial production without any pilot-plant experience, and there are "bound to be 'bugs' which must be ironed out."

He said while synthetic rubber plans collide with the high-octane gasoline program, he does not believe there will be any real interference once the actual situation can be measured when the plants get into operation.

Eastman told the committee of the various steps which have been taken to increase the movement of oil to the East and disclosed that 392 tank trucks will be built this month under WPB authorization, with 500 more to come later. Such trucks, he said, can take the place of tank cars for short runs, and one truck will relieve maybe three or four cars and in some instances has been known to do the work of 20.

Land, while opposing converting Liberty ships from oil to coal because of operational limitations imposed by the latter, said that five new tanker shipyards will be completed this year, and 209 ocean-going and 64 coastal tankers and 52 concrete barges will be delivered into service during 1943.

Pipe Line Deliveries to East Coast Attain Peak

Although not sufficient to overcome the supply shortage, pipe-line deliveries to the East now exceed 160,000 barrels a day, it was reported by PAW January 5.

This is more than was counted upon in setting up the schedule of pipe-line deliveries, it was said, but represents about all that can be expected until the expansion of the Plantation line is completed and the pipe line between Steubenville, Ohio, and Philadelphia goes into operation, when 42,000 barrels daily will be added.

The building up of the pipe-line system, Ickes said, "is indicative of the tremendous effort which is continuously being made to maintain petroleum supplies for the armed forces, for war industry, and insofar as is humanly possible, to relieve the serious shortage of civilian supplies of gasoline and fuel oil.

"The constantly heavy demands of the armed forces and the current cold-weather drain on fuel-oil stocks in the East emphasize again the importance of the pipe-line program which has been under way during the past year. Only the prompt, pre-winter completion of a major part of that program has made possible the record rate of pipe-line deliveries of oil that are now helping to minimize the oil problem in the East."

Rail deliveries to the East staged a dramatic come-back during the week ended January 2, with an average of 775,409 barrels daily, an increase of 74,582 barrels over the discouragingly low level of the preceding week.

Filling Big-Inch Line With Oil Is Underway

Determined to make good on its ambition to have oil in the big-inch pipe line before the end of 1942, War Emergency Pipeline shot 75 miles of water into the conduit for test purposes and on New Year's Eve followed up with a charge of oil, it was reported by PAW January 5.

The oil, however, will not reach the Norris City terminus for several weeks, but the line will be filled as fast as block gates are installed ahead of the stream.

With the repair of the break in the Mississippi crossing and completion of valve installations, the line will be put into operation, initially moving about 90,000 barrels a day and increasing its capacity as additional pumping stations are brought in. Deliveries are expected to hit about 150,000 barrels daily with 3 to 4 stations operating, and all 11, giving capacity load of 300,000 barrels, are expected to be in service before the end of March.

PIWC Paints Gloomy Eastern Outlook Although Deliveries Will Increase

A pessimistic picture of the Eastern outlook, drawn by its committee on petroleum economics, monopolized much of the time of the first 1943 meeting of the Petroleum Industry War Council.

A number of recommendations were made for correcting the situation, but it was indicated that little relief is to be expected, even over a period of months.

"The situation will become progressively more critical, unless effective steps are taken promptly to reduce demand and augment supplies," the council was told by Robert E. Wilson, chairman of the economics committee, in submitting his report.

His forecast was supported by estimates of supply and demand for the current quarter, which showed that January supply will be deficient by 345,000 barrels daily, that for February short by 203,000 barrels daily and that for March short by 54,000 barrels daily. This is after allowing for the opening of the big-inch pipe line which is expected to increase East Coast tank car receipts from 714,000 barrels daily this month to 780,000 barrels daily in February and 875,000 barrels daily in March, and still heavier pipe line deliveries into District 1, which are estimated as increasing from 172,000 barrels daily in January to 189,000 barrels daily next month and 190,000 barrels daily in March. An increase in barge and lake tanker deliveries also was estimated, from 95,000 barrels this month to 107,000 barrels in February, dropping back to 106,000 barrels the following month. But against these increases other deliveries, estimated at 85,000 barrels daily for January, were seen as declining to 70,000 barrels daily for the two succeeding months. Total supply, the report showed, will average 1,146,000 barrels daily for the current month, 1,226,000 for February and 1,319,000 for March, and in the same period total demand will drop from 1,491,000 barrels daily for January to 1,429,000 for February and 1,373,000 for March, reflecting the usual seasonal trend. There-

after, mainly due to military consumption, demand will increase substantially.

"Stocks in District 1 are already far below normal levels and are nowhere near adequate to make up the deficiency between estimated demand and supples," the report declared. "Supply and distribution difficulties are already being encountered at existing stock levels, which are being reduced at about the alarming rate forecast for January. The committee estimates that even if available supplies were adjusted proportionately between all products and areas, critical minimums would be reached in all cases about January 20. Actually, because of non-uniform distribution, critical shortages must be faced in specific products even earlier, as evidenced already by inadequate supplies of gasoline in some areas, and current serious difficulties in supplying essential requirements of resdual fuel oil at many points."

The major factors contributing to the shortage, it was explained, are: (1) The sudden imposition, without adequate notice, of large and concentrated requirements for military export upon an already tight East Coast situation; (2) The actual rationing measures were not effective in reducing demand to the extent estimated by OPA, and (3) continued reduction in tank car deliveries as a result of flood and other weather conditions.

"While every effort is being made to increase overland shipments, particularly by tank car, it is not believed that such increases as may be accomplished will be sufficiently large, or realized soon enough, to materially relieve the emergency," the committee held.

"The anticipated tank car shipments are primarily predicated upon the War Emergency Pipeline beginning deliveries to Illinois by February 1. Prospective delay due to washing out of part of the Mississippi River crossing will make for an even worse situation.

The committee expressed the belief that current indicated deliveries of gasoline into domestic consumption are still about 40,000 barrels daily greater than required for minimum essential needs and recommended downward revision of A, B and C coupon values and restrictions on T coupons be tightened.

The January 2 cut in the value of heating oil coupons will result in a reduction of 30,000 to 35,000 barrels a day. Because they were just going into effect, the committee had no comment on the orders prohibiting pleasure driving and cutting heating oil supplies for non-residential structures by 25 percent, but estimated that possibly 75,000 barrels of the shortage can be picked up by the two avenues it mentioned and warned that "to cut any deeper on either gasoline or fuel oil would so seriously interfere with public health and safety, and with getting war workers to and from their jobs, that the committee feels that consideration must be given to getting some assistance from the military forces to tide over the critical period which is only two months in length.

The report this month did not make any forecasts for the other districts, but points out that the problem of balancing refinery runs and product yields in Districts 1, 2 and 3 has become more serious.

This situation, the committee said, is complicated by the necessity of maintaining levels of minimum crude runs to still and gasoline production required by refineries producing essential war products, such as aviation gasoline, toluene and synthetic rubber, while current reduced outlet for District 3 refineries, occasioned by reduced transportation facilities, and maladjustment of prices in certain areas, is causing stock accumulations resulting in loss of flexibility, which is being reflected in inability to take advantage of maximum potential capacity for supply of essential war products. In District 1, too, substantial losses in output of war products are being incurred in refineries as the result of inadequate crude supplies. "This situation will become progressively worse, which emphasizes the imperative necessity of adjusting refinery runs and yields within and between districts which has been pointed to in the committee's last three reports," the council was told. "Studies are now in process by the refining division of PAW, and within the various districts, and the committee urges that these studies be completed as promptly as possible, as corrective action is urgently needed to avoid current and future aggravated loss in output of essential war products, since such corrective measures will heavily penalize small refineries not producing war products, but supplying needed fuel to railroads and war industries, and since they will have to be diverted to making maximum yields of low-value fuel oils, some means will have to be found to keep these refineries solvent."

Recommendations

Specific recommendations of the committee were as follows:

It is believed that the last 10 percent cut in the value of domestic fuel oil coupons have reduced fuel oil consumption as far as it can safely be reduced, and that even this last cut will create serious hardship unless the remainder of the winter is warmer than the average.

It is believed that there is still about 40,000 barrels per day of unnecessary gasoline consumption which should be eliminated so far as possible by some moderate temporary reductions in the value of all coupons, and by more attention to the giving out and placing of "T" coupons for commercial vehicles.

In future rationing programs, the outstanding coupons must be much more closely adjusted to available supplies.

Prompt steps should be taken by PAW and other government bodies concerned to determine, carry out and compensate for the necessary changes in refinery operations together with the corresponding rearrangement of transportation facilities in order to avoid further loss in output of essential war products.

From the standpoint of continuous capacity operation of the big inch line and uninterrupted operation of war products plants on the Gulf Coast, it is important that pipe line project from Southwest Texas to Houston be pushed to completion as soon as possible.

Much of the current public misunderstanding of the East Coast supply situation is due to the secrecy orders which have since last spring prevented publication of any figures as to East Coast stocks. It is believed that there is no military reason why such information should not be published without segregation as to locality, and the petroleum administrator is requested to endeavor to secure release from present restrictions on publication of these figures.

During its sessions, the council received information regarding the situation in various phases of the war program from Rubber Director Jeffers and members of his staff, George Hill, Jr., of the Defense Supplies Corporation, and Administrator Ickes.

A progress report was received from the recently formed manpower committee, in which the industry was urged promptly to furnish the information sought in the questionnaire which has been distributed.

The price problem was canvassed and the council was told that studies which have been underway for some time are nearing completion and a final report, including specific recommendations in each case, will be prepared before next month's meeting.

George A. Hill, Jr., president of Houston Oil Company, Houston, was appointed chairman of the committee on protection of operating facilities, succeeding the late William S. Farish.

Tanker Building Getting Into High

Sixty-two new tankers were delivered into service during 1942, part of a fleet of 746 vessels of 8,090,800 deadweight tons built under the Maritime Commission's program, it was reported January 5 by Chairman Emory S. Land.

The tanker program, which will be materially expanded this year under the schedule calling for the delivery of 16,000,000 tons of new shipping, was getting into high at the close of 1942, with 10 vessels turned out in December, 7 of them by Sun Shipbuilding and Dry Dock Company, Chester, Pennsylvania. Also during the month the first large tanker to be built in a West Coast yard, was delivered by Kaiser Company, Inc., from its Swan Island plant at Portland, Oregon.

Tanker deliveries during 1942 included 3 of 45,400 deadweight tons from the Bethlehem-Fore River Yard at Quincy, Massachusetts; 13 of 197,400 tons from the Bethlehem - Sparrows Point Shipyard, Inc., Sparrows Point, Maryland; 2 of 33,800 tons from the Federal Shipbuilding and Dry Dock Company, Kearny, New Jersey; 1 of 16,600 tons from Kaiser Company, Inc., Portland; 41 of 673,400 tons from Sun Shipbuilding and Dry Dock Company, and 2 of 31,300 tons from the Welding Shipyards, Inc., Norfolk, Virginia.

OPA Redefines Fuel Oils Given Higher Prices

Distillates and residual oils heretofore subject to price increases to cover higher transportation costs were redefined January 5 by the Office of Price Administration, and several ports were added to the list of Atlantic and Gulf Coast points where specific prices on Bunker C and No. 6 fuel oils have been established.

The price schedule also was amended to include such oil shipped by motor transport and tank cars when such facilities are used as a substitute for barges and tank ships.

In the amended order, distillate and

distillate-fuel oils subject to the 1.5-cent-per-gallon increase previously authorized to cover higher Eastern transportation costs are defined as those "having a viscosity below 85 seconds Saybolt Universal (at 100° F.) including the following: tractor fuel, gas-house oils, distillate Diesel fuel oils, Nos. 2, 3 and 4 fuel oils, kerosine, range oil, No. 1 fuel oil, standard light gas oil, gas-house standard light gas oil, and Mirando and Mirando type crude oil when sold as No. 4 fuel oil or other distillate fuel oil use."

Residual fuel oils subject to the 30-cent-a-barrel increase authorized August 5, last, to cover increased transportation costs, are to include "all residual and residual-type fuel oils having a viscosity of 85 seconds Saybolt Universal (at 100° F.) and above, including Nos. 5 and 6 fuel oils, Bunker C, Navy grade, residual Diesel fuel oils, residuum gas oil, heavy gas oil, heavy gas-enrichment oil, gas-house heavy fuel oil, N. E. gas-enrichment oil, S. W. gas oil, Admiralty fuel oil, Navy Special fuel oil, Mirando and Mirando type crude when sold as No. 5, or other residual fuel oil, or as a heavy gas-enrichment oil."

Added to the list of ports at which maximum prices for Bunker C and No. 6 fuel oils are established are Fall River, Massachusetts; Portsmouth, New Hampshire; New Haven, Connecticut, and Wilmington, North Carolina, $1.65; Miami, $1.60; Tampa, $1.50; Pensacola, $1.15, and Mobile, $1.10.

PAW Authority Over Materials Strengthened

Authority of the PAW in the field of materials was seen strengthened by the announcement January 5 of the delegation to that agency by WPB of the authority to amend or revoke conservation orders of the M-68 series, controlling the use of materials by petroleum enterprises.

The principal purpose of the delegation, it was explained, is to make it possible for the administrator to supersede the M-68 orders by Petroleum Administrative Orders.

The M-68 orders set forth the spacing pattern and other requirements which must be met by operators seeking to acquire material.

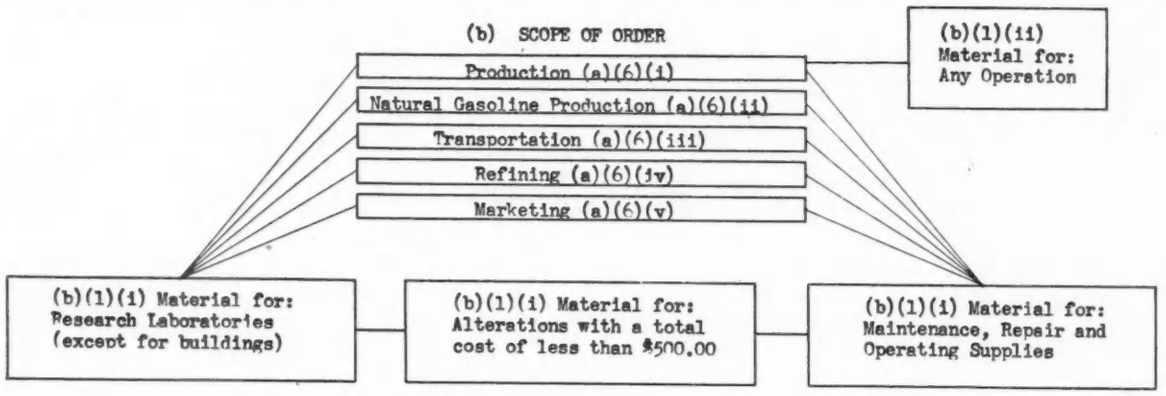
Graphic Picture of P-98-b Scope and Method of Applying Ratings

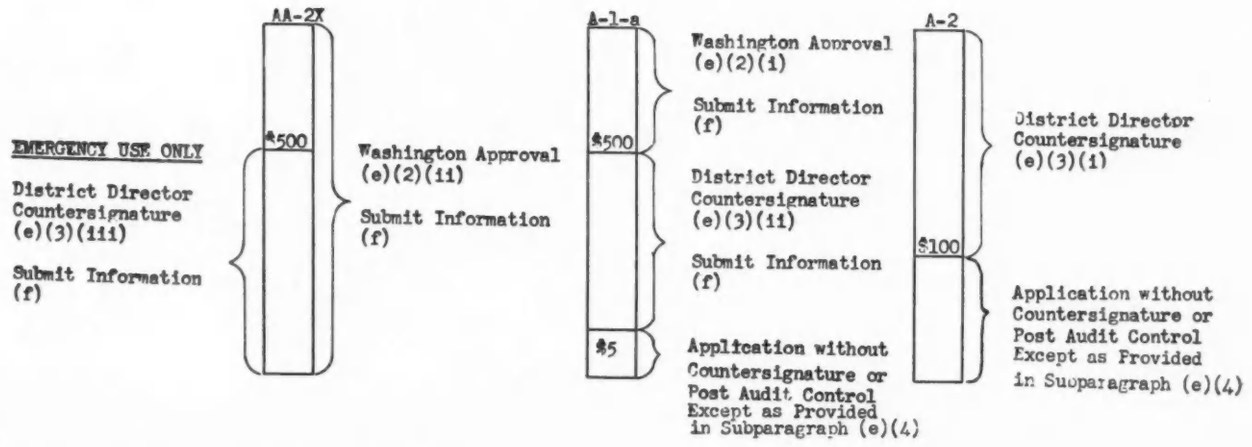
A graphic representation of Preference Rating Order P-98-b, intended to clarify the provisions of paragraph (b), "scope of order," and paragraph (e), "method of application of preference ratings," has been distributed to district officials of PAW by G. W. Orton, director of materials.

Each item portrayed in the graph is cross-referenced to the applicable subparagraph in the text of the order, but the chart is designed merely to supplement the text of the order for the purpose of clarity and convenient reference and in no way, Orton said, obviates the necessity for a detailed understanding of the provisions of the order.

In addition, Orton specifically directed the attention of field officials to certain provisions of the order not indicated in the graph, explaining that in the event that the material is to be used in service station operations, subparagraph (e)(4) requires a countersignature on the purchase order or contract before the rating is applied in any case where an A-2 preference rating is required for an item costing less than $100 or an A-1-a preference rating for an item costing $5 or less. In addition, the restrictions of paragraph (d) apply to the use of any preference rating assigned by the order, as well as the provisions of subparagraph (e)(1) and of paragraphs (g), (h), (i), (j) and (k).

The chart itself is as follows:


(b) SCOPE OF ORDER
Production (a)(6)(i)
Natural Gasoline Production (a)(6)(ii)
Transportation (a)(6)(iii)
Refining (a)(6)(iv)
Marketing (a)(6)(v)
(b)(1)(ii) Material for: Any Operation
(b)(1)(i) Material for: Research Laboratories (except for buildings)
(b)(1)(i) Material for: Alterations with a total cost of less than $500.00
(b)(1)(i) Material for: Maintenance, Repair and Operating Supplies



Materials Controversies Delayed Rubber Program "Many Months," Senate Learns

Controversy over the use of critical materials needed to convert refineries to the production of butadiene delayed the PAW conversion program for "many months," Assistant Deputy Administrator Bruce K. Brown told the Senate Agriculture Committee January 6.

"Had they been given the green light and started on their way at the time that refiners and natural-gasoline manufacturers had first proposed them, they would have been in operation many months prior to the best completion date which can be predicted for a whole new plant," Brown declared.

Relating the effort to get a butadiene program under way with the use of a minimum of material, Brown explained that the idea was not received with "much favor" when it was first proposed to Rubber Reserve Company last January but by late spring the materials situation had become so difficult as to lead to a change in attitude. Thereafter PAW officials and members of PIWC synthetic rubber committee toured the refining centers of the country, lining up refineries which could be converted, and in July submitted a list of potential conversions by which a total of 346,500 tons of butadiene a year could be secured.

"During the period May to August, 1942, those in authority in the rubber program had driven ahead with plans for the location of polymerization plants at certain points in the country," he told the committee. "Designs had been made, land had been purchased and considerable amounts of fabricated material had been ordered. Those in authority were loathe to change their plans and to split up a few large polymerization units into a number of small ones in order to accommodate butadiene which could be produced at the various points in the country. Further, considerable progress had been made in building or preparing to build the so-called 'regular butadiene plants.' Immediate adoption of the proposals which we submitted for the production of butadiene by the conversion of existing refineries was resisted on another ground, namely, that we had not absolutely proven that the conversions could be accomplished with the use of, say, only 20 percent of new critical construction material and had not been able to provide complete bills of material on projects which had not yet been engineered."

"For a time," he added, "the merits of the refinery-conversion program were pretty well bogged down in arguments as to just what percentage of new equipment would be necessary to accomplish the result. That delay was unfortunate, because it was obvious then just as it is now that whatever amount of new construction material would be required would still be less than that required to build a new plant.

Brown submitted a list of conversion projects which have been authorized, 3 of them before the Baruch report and 11 since. The initial 3 were Atlas Oil & Refining Company, Shreveport, Louisiana, to produce 8000 to 10,000 tons a year; Sun Oil Company, Toledo, Ohio, 15,000 tons, and Standard Oil Company of Louisiana, 10,350 tons. The later projects were Lion Oil Refining Company, El Dorado, Arkansas, 6700 tons; Eastern States Petroleum Company, Houston, 12,800 tons; Southport Petroleum Company, Texas City, 8000 tons; Pan American Petroleum Corporation, Texas City, 10,000 tons; Humble Oil & Refining Company, Ingleside, Texas, 7000 tons; Taylor Refining Company, Corpus Christi, Texas, 5500 tons; Standard Oil Company (Indiana), Wood River, Illinois, 41,500 tons; Ohio Oil Company, Robinson, Illinois, 3500 tons; Magnolia Petroleum Company, Beaumont, Texas, 15,000 tons; Standard Oil Company of California, El Segundo, 15,000 tons, and Arkansas Fuel Oil Company, Bossier City, Louisiana, to purify 18,000 to 20,000 tons produced by Atlas Oil & Refining Company and Lion Oil Refining Company projects. All of the other projects will purify their own production except Pan American Petroleum Corporation, which will be purified by Southport Petroleum Company; Taylor Refining Company to go to Humble Oil & Refining Company, and Ohio Oil Company to go to Standard Oil Company (Indiana).

Under questioning by Senator Gillette of Iowa, chairman of the committee, Brown admitted that the Standard Oil Company of California project at El Segundo would cost $2,815,000 for materials, as compared with much smaller amounts for the other projects, but explained it was desired to make rubber in California from natural butane, which required an unusually high proportion of new equipment.

A new Cities Service Oil Company refinery and butadiene plant at Lake Charles, Louisiana, will be completed on schedule October 1, he said. This plant was specially designed to produce a large amount of high-octane aviation gasoline.

Brown also discussed the "competition" between the 100-octane program and synthetic rubber for petroleum raw materials, denying that any difficulties would be encountered after the rubber program got in its stride.

"There are over 55 refinery locations at which 100-octane gasoline is produced or is scheduled to be produced as a finished product ready for use," he said. Out of these 55-plus refinery locations, there are only 11 at which any butylenes there produced will be converted into butadiene. Five of these refineries are the companies making up the Port Neches group—Atlantic, Gulf, Magnolia, Texas and Pure. Others are Humble (Baytown), Standard of Louisiana (Baton Rouge), Cities Service (Lake Charles), and Sinclair (Houston). In addition, Pan American and Crown Central, both of whom will produce 100-octane gasoline, will also produce butylenes to be shipped to Sinclair (Houston) for conversion to butadiene.

"There are many refineries which will produce 100-octane but no rubber raw materials and there are many other refineries which will produce butadiene from petroleum materials other than butylene, some of which refineries will produce 100-octane and some will not. None of these other situations appears at all pertinent. It does not appear to me that there can be such a thing as a real competition for butylenes between 100-octane and rubber except in the very narrow sense that at a given refinery with a limited amount of petroleum material and a limited capacity for producing butylenes, some decision has to be made before equipment for 100-octane gasoline and synthetic rubber is actually installed, as to whether one should make both products at that refinery or concentrate on one product. Having made such a decision, the equipment should be designed accordingly and installed in proper sizes to achieve the end result."

At the Office of the Rubber Director, it was said a "green light" is imperative if the rubber program is not to fail, completion of more than two-thirds of the program, it was declared, is dependent upon the granting of priorities.

It was disclosed by Director William M. Jeffers that the highest possible priority has been granted for completion of 20 percent of the program as well as for a similar proportion of the high octane gasoline program, but that the fate of the remainder is dependent upon consideration now going on of the relative importance of the two programs as they affect other major programs of the war effort.

Bill to Prohibit Use of Defense Lines for Gas

A bill prohibiting the use of any pipe line built under the Cole Pipe Line Act for transportation of natural gas was among the first measures to be introduced at the opening of the new Congress.

The bill was submitted by Senator O'Daniel of Texas, who last year was opposed to the building of the "big inch" line because of fears that after the war it would be used for the export of natural gas from Texas to the Eastern states.

Also introduced in the opening days of the session was: A bill to halt OPA's tire inspection program, by Representative Mansco of Alabama; a resolution setting forth the policy of the government with respect to submerged oil lands, by Representative Angell of Oregon; and a resolution for continuance of the Senate investigation of the oil situation, by Senator Maloney of Connecticut.

Indiana Company Contracts To Build Defense Plant

Execution of a contract with Standard Oil Company (Indiana) for construction for Defense Plant Corporation of plant facilities in Illinois at a cost in excess of $13,000,000 was announced by Secretary of Commerce Jesse Jones January 5.

Will Manufacture 500 Tank-Trucks for East

Authority to manufacture 500 semi-trailer tank trucks was issued by the Office of Defense Transportation January 8 in an effort to free more tank cars for the Eastern service.

When the Smoke of Battle Clears Away

Official U. S. Army Photograph

Samples from every heat of steel must stand the rigid machinability laboratory test.

Tesco Steel castings today are "riding the range" with our tank corps. When the command is "ATTACK" and these machine-monsters rumble into action, Tesco steel castings, in the form of steel armor plate and other vital parts, must be able to give as well as take. But we of Tesco are used to thinking in terms of tough, exacting service for our steel castings under the most **un**usual conditions. Knowledge gained in years of exacting . . . exclusive . . . pouring of oil field castings for 80% of the major oil tool manufacturers gave us the experience to qualify for our "big" job today. Right now our shops are given over almost 100% to pouring steel castings for the ordnance departments of our army, navy and maritime commission.

But when the war is won and the SMOKE OF BATTLE CLEARS AWAY, Tesco will in turn use the knowledge that has come from our experiences today, and make even better castings as a result of new experiences with new combinations of steels and metals than ever before.

TEXAS ELECTRIC STEEL CASTING CO.

HOUSTON, TEXAS

R. W. Gallagher Named Jersey President; Holman Advanced to Executive Committee

R. W. Gallagher was installed as president and chief executive officer of Standard Oil Company (New Jersey) January 5, succeeding the late W. S. Farish. At the time of the appointment Gallagher was chairman of the board, a post that will not be filled.

At the same time Eugene Holman, a vice president and member of the board, was elected a member of the executive committee.

Gallagher was born in Salamanca, New York, in 1881, and started his career with East Ohio Gas Company as a boiler tender. He later became president of the company, and in 1933 he joined Standard Oil Company of New Jersey to take over some of the duties connected with the supervision of the company's extensive gas interests. Gallagher was elected to the board of directors of the oil company in 1933 and was appointed a vice president in 1937. In November, 1942, he was elected chairman of the board, succeeding W. C. Teagle, resigned.

Holman, 47, is a native of San Angelo, Texas. He studied engineering and geology at the University of Texas and he took his first job in Cuba and the West Indies. He served in the photographic division of the Army Air Corps in World War I, and upon his return from France he took a job with the United States Geological Survey. His work took him to Fort Worth, Texas, where he met Wallace E. Pratt, then chief geologist for Humble Oil & Refining Company and now a director of Standard Oil Company of New Jersey. He had met Pratt soon after leaving the university, and the result was a job in Humble's geological department.

Holman had experience in the Ranger boom, and succeeding years found him in the Louisiana, Arkansas, Mexia, and Smackover strikes. He was made superintendent of the North Louisiana and Arkansas division in 1923, and two years later he became chief geologist for the company.

R. W. GALLAGHER

EUGENE HOLMAN

In 1929 Holman resigned to become assistant to E. J. Sadler, vice president of the Jersey company. He devoted his attention chiefly to producing problems in foreign countries, especially in South America. He became president of Creole Petroleum Corporation and Lago Petroleum Company and an officer or director of various other operating subsidiaries in Latin America.

Michigan Starts Geology Course for Women Students

The University of Michigan, Ann Arbor, has anounced a one-year curriculum for women students in petroleum geology, starting February 4, 1943.

During the following 12 months, those enrolled in this curriculum will be given as much academic work in geology as a student ordinarily obtains in 4½ years. During 12 weeks in the summer of 1943 the group will be moved to Camp Davis, Jackson Hole, Wyoming, for field work in geology and instruction and practice in geological drafting.

A maximum of 46 hours of credit can be earned. This credit can be applied toward a degree at the University of Michigan or at other institutions. Those with a bachelor's degree will receive 29 hours of graduate credit. A certificate will be given upon successful completion of the curriculum. No fees other than the regular University fees will be charged.

Prerequisites for admission to this concentrated program include 1 year's work in physical and historical geology, trigonometry, and a "B" grade average.

The purpose of this curriculum is to supply the oil companies with replacements in their geological staffs. The program was prepared after consultation with geologists representing most of the larger oil-producing companies. The group will be limited in size to the number that the industry promises to employ. All such promises are contingent upon the country still being at war on February 1, 1944. Application for admission to the curriculum will be considered in the order of receipt.

Men classified in 4F but physically able to do field work are also eligible for this program.

South Alberta Well Producing Steadily

During 1942 another important oil-producing field was established on the great plains of Southern Alberta.

This is the Taber field, proven by Standard Oil Company of British Columbia's No. 1 well, 3½ miles south of the town of Taber, on the Kherkoff farm.

The well on the pump has been making 300 barrels although pinched down now to 200 barrels.

The oil is of a low grade but of a type much in demand in view of the heavy wartime demand for oil. The well is expected to go on steady production in the new year. The oil thus far has been loaded out to the Huff refinery at Lethbridge and a Moose Jaw buyer.

Subsequent drilling at Taber has not been so successful. Standard's second well proved non-commercial and two wells put down in the field by the Clancy-Ti-Test group of Toronto likewise were abandoned and plugged. Hi-Test has now spotted its third well, which will offset the Standard No. 1. Standard's No. 3 has not been started but it is expected to be under way early in 1943.

PIWC Committee Will Study Legal Problems

Legal questions arising from the inability of operators to secure material for drilling on leases are to be studied by a special legal committee of PIWC, appointed by Chairman William R. Boyd, Jr., January 4.

Charles I. Francis, of Vincent, Elkins, Weems and Francis, Houston, will be chairman of the committee, which will consist of Forrest M. Darrough, Carter Oil Company, Tulsa; Don Emery, Phillips Petroleum Company, Bartlesville; A. M. Gee, Ohio Oil Company, Findlay, Ohio; L. A. Gibbons, Union Oil Company of California, Los Angeles; Wallace E. Hawkins, Magnolia Petroleum Company, Dallas; William L. Holloway, Honolulu Oil Corporation, San Francisco; Gilbert Mueller, Argo Oil Company, Denver, and G. T. Stanford, Consolidated Oil Corporation, New York.

Boyd explained that possibilities of termination or forfeiture of oil and gas leases have been raised by government orders and directives which make it impossible for the industry to comply with lease obligations, the inability to obtain priorities for materials for drilling beng the most important of the government regulations preventing the carrying out of lease terms, and the committee has been instructed to determine if and how existing federal and other laws might be amended to afford protection to operators who, purely because of compliance with government orders, are unable to fulfill their responsibilities.

Increased Refinery Runs Help Products Supply; Draft on Crude Stocks Indicated

Through a sharp increase in crude runs to stills, refinery production of major petroleum products was sufficient in the week ended January 2 to slow down materially the withdrawals of light and heavy fuel oils from storage and to result in a fairly satisfactory reaction of gasoline stocks, which increased about normally, although perhaps more than necessary. The increased refinery throughput probably was achieved, however, only through a substantial draft on dwindling crude stocks. Reaction of crude storage was not known pending announcement of Bureau of Mines figures for the week, but in the previous week crude stocks increased 110,000 barrels daily while runs to stills were 209,000 barrels per day lower, suggesting withdrawal of considerable crude in the week of January 2, with crude production about the same for both weeks.

In contratst with the withdrawal of 2,000,000 barrels of light fuel oil from storage in the week ended December 19, there occurred a draft of only 886,000 barrels in the week ended January 2, stocks having decreased to 42,913,000 barrels. That quantity was, however, 7,000,000 barrels or 14 percent less than the 50,119,000 barrels on hand January 3 a year ago. In the face of the smaller inventory, potential demand is greater than at this time last year, because more oil burners are in use, and consequently, present stocks are materially short of requirements.

Stocks of residual fuel oil were maintained better than in earlier weeks, having been reduced only 81,000 barrels. In the previous week they were drawn upon to the extent of 1,243,000 barrels. The total of 72,881,000 barrels reported for January 2 was nearly 22,000,000 barrels lower than that of 94,700,000 on

Gasoline Stocks Up

hand January 3 a year ago, a decrease of 23 percent.

The national inventory of finished and unfinished gasoline was increased 2,192,000 barrels in the week ended January 2, from 80,228,000 to 82,420,000 barrels. In the previous week there had been an increase of 1,097,000 barrels, and in the corresponding week a year earlier there was an accumulation of more than 4,000,000 barrels. Gasoline stocks are down fairly well in line with the curtailment of demand. The total of 82,420,000 barrels held January 2 compared with 95,707,000 barrels reported for January 3 last year, a decrease of 13,287,000 barrels (13.8 percent) since a year ago.

The crude runs to stills averaging 3,734,000 barrels daily in the week ended January 2 were 209,000 per day above those in the previous week but 234,000 barrels or 5.8 percent under the runs of 3,968,000 barrels daily in the week of January 3 a year ago. These figures, coupled with above data on reaction of stocks, roughly reflect the retarding effect that present war conditions are having on the total demand for petroleum.

Similarly, the effect on demand for domestic crude and on domestic crude production is reflected in the fact that crude production in the week ended January 2, about the same as in the previous week, was down 4.1 percent (167,000 barrels daily) from a year before. As heretofore, domestic production is down somewhat less than refinery runs, as domestic fields have had to compensate for interruption of normal imports of South American and other crudes.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[1]4,120	10-18	266,187	3-29	99,727	3- 29	[1]54,983	11-15	102,448	1- 4
1942	[1]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,861	11-14	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
Trends in 1942 Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29.240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,304	.....
July 25	3,691	.....	3,658	.....	249,262	.....	82,281	.....	35,966	.....	77,816	.....
August 29	3,964	.....	3,697	.....	249,007	.....	80,831	.....	42,060	.....	78,034	.....
September 26	3,909	.....	3,802	.....	242,785	.....	80,550	.....	45,945	.....	78,943	.....
October 31	3,901	.....	3,731	.....	239,266	.....	79,159	.....	48,131	.....	79,166	.....
November 28	3,878	.....	3,736	.....	234,850	.....	78,854	.....	49,739	.....	77,796	.....
December 5	3,834	.....	3,760	.....	232,982	.....	75,934	.....	48,663	.....	75,219	.....
December 12	3,881	.....	3,744	.....	231,896	.....	77,622	.....	47,794	.....	74,785	.....
December 19	3,892	.....	3,667	.....	232,457	.....	79,131	.....	45,880	.....	74,205	.....
December 26	3,881	.....	3,525	.....	233,227	.....	80,228	.....	43,799	.....	72,962	.....
January 2, 1943	**3,871**	.....	**3,734**	.....		.....	**82,420**	.....	**42,913**	.....	**72,881**	.....
January 3, 1942	4,038	.....	3,968	.....	[4]243,990	.....	95,707	.....	50,119	.....	94,700	.....
Change:												
In week	—10	.....	+209	.....	+770	.....	+2,192	.....	—886	.....	—81	.....
In year	—167	.....	—234	.....	—10,763	.....	—13,287	.....	—7,206	.....	—21 819	.....
In year	—4.1%	.....	—5.8%	.....	—4.4%	.....	—13.8%	.....	—14.3%	.....	—23.0%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, December 27, 1941.

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED Jan. 2	Jan. 9
Arkansas	73,600	74,900
California	770,000	771,000
Long Beach	33,500	35,000
Midway-Sunset	54,900	55,000
Kettleman Hills	43,400	42,500
Wilmington	93,200	95,300
Rest of State	545,000	543,200
Colorado	6,700	6,650
Illinois	247,150	253,850
Salem	31,700	31,750
Louden	41,250	42,800
Other New Pools	162,400	167,200
Old Pools	11,800	12,100
Indiana	16,350	15,850
Kansas	288,350	256,400
Kentucky	12,000	11,300
Louisiana	316,100	339,850
North	92,800	93,000
South	223,300	246,850
Michigan	59,950	59,400
Mississippi	58,150	63,350
Missouri	100	95
Montana	21,800	21,800
Nebraska	2,950	2,900
New Mexico	93,450	93,450
New York	13,050	15,700
Ohio	9,100	10,000
Oklahoma	354,000	349,800
Oklahoma City	62,500	62,400
Seminole Area	81,650	79,600
Rest of State	209,850	207,800
Pennsylvania	49,000	49,300
Tennessee	35	35
Texas	1,377,700	1,329,200
Upper Gulf Coast	311,500	308,750
East Texas Field	350,850	327,950
Rest of Eastern Texas	101,550	101,450
Lower Gulf Coast	110,600	99,050
Southwest Texas	49,800	48,850
South Central Texas	17,350	17,650
West Texas	206,900	200,450
North Texas	138,750	136,600
Panhandle	90,400	88,450
Utah	10	10
West Virginia	9,850	7,000
Wyoming	93,950	89,250
Total United States	3,873,345	3,821,090

More Domestic Crude Needed During First Quarter Despite Motor Fuel Curtailment

An increase of four percent in the demand for domestic crude during the first quarter of 1943 compared with last year was forecast by the Bureau of Mines January 5 in the face of an expected decline of about 12 percent in motor-fuel demand and a very slight drop in crude runs to stills.

The increase, the bureau said, will be due to reduced imports and a more normal movement of refined stocks as compared with a year ago.

Demand for domestic crude for January was forecast by the bureau as 3,912,900 barrels daily, or about 17,000 barrels daily more than the actual in the first month of 1942. January recommendations of the PAW, issued December 21, called for 4,124,200 barrels daily of petroleum liquids.

Crude Stocks Decline in December

The bureau reported that during the five weeks ended December 5, crude oil production averaged 3,868,000 barrels daily and runs to stills were 3,736,000 barrels, while stocks of domestic crude oil declined at a rate of 159,000 barrels a day, indicating a demand for domestic crude of 4,027,000 barrels daily.

"Current data available for the fourth quarter of 1942, compared with the same period of 1941, indicate a decline in total motor-fuel demand of 13 percent," the bureau stated in reviewing the situation. "The demand was higher than anticipated due to unusual government purchases, larger exports, and advance buying and stocking in October and November that offset the effect of the extension of rationing in December. For the fourth quarter of 1942, the bureau estimates that crude runs will average about 3,720,000 barrels daily and that the gasoline yield from crude will be about 38.2 percent, both items showing a downward trend during the quarter. The demand for domestic crude will average about 3,940,000 barrels daily, involving a production of 3,875,000 daily and withdrawals from crude stocks of about 65,000 barrels daily.

More Domestic Crude

"The bureau anticipates a decline of about 12 percent in total motor fuel demand during the first quarter of 1943 compared with the same period in 1942. It is expected that crude runs to stills will average about 3,700,000 barrels daily, or less than 1 percent below the first quarter of 1942, and that the demand for domestic crude petroleum will approximate 3,910,000 barrels daily, a gain of almost 4 percent. The gain in the demand for domestic crude petroleum, in spite of an expected material decline in the total demand for all oils, will be due to the reduction in total imports and to a more normal change in refined stocks as compared with the abnormal withdrawal of over 27,000,000 barrels in the first quarter of 1942. While refined stocks in District 1 may be reduced to economic minimums, they may be built up in other districts in anticipation of war needs and of the completion of new transportation facilities."

Total demand for motor fuel for this month is estimated at 44,800,000 barrels, or 14 percent below that of January, 1942.

Stocks of finished and unfinished gasoline, which amounted to 76,622,000 barrels October 31, are indicated by American Petroleum Institute statistics to have declined about 1,200,000 barrels during November, and the bureau estimated and increase of 4,400,000 barrels during January.

Direct sales of natural gasoline are estimated at 1,600,000 barrels, making an indicated refinery production of 47,600,000 barrels, to be distributed between the several refining districts as follows: East Coast, inland Texas, Texas Gulf Coast, Louisiana Gulf Coast and inland Louisiana-Arkansas, 20,610,000 barrels; Appalachian, 1,950,000 barrels; Indiana, Illinois, Kentucky, etc., 10,680,000 barrels; Oklahoma, 2,550,000 barrels; Kansas, 2,780,000 barrels; Rocky Mountain, 1,290,000 barrels; California, 7,740,000 barrels.

Natural gasoline to be blended at refineries is placed at 5,160,000 barrels. The yield is estimated at 37 percent, the bureau pointing out that, while this is lower than has yet been reached, a higher yield would result in either deficient quantities of fuel oils being produced or in excessive additions to gasoline stocks. Application of that yield to the straight-run and cracked gasoline production of 42,440,000 barrels gives total crude runs of 114,700,000 barrels, or 3,700,000 barrels daily.

Crude oil for export and to be used as fuel, and losses, is estimated at 6,800,000 barrels, giving an estimated demand for domestic crude of 121,300,000 barrels, or 3,912,900 barrels daily.

Markets Still Featured by Acute Shortages in East

Increased acuteness of the shortage of petroleum products in the East Coast district features the market situation, with most companies not having sufficient material to fulfill their obligations, while they have very little hope of receiving enough additional supplies to relieve the strain. This situation has given rise to the need of official guidance in the form of priority lists, indicating which consumers should be given prior consideration. Gasoline, heating oil, and industrial grade fuel oils are all extremely scarce.

Refiners and marketers in the Middle West have put forth special efforts to ship oils into the East Coast district to relieve the shortage there, but lack of enough transportation has been a handicap. The markets for gasoline, kerosene, heating oil, and heavy fuel oil within the Mid-West region naturally are very tight in these circumstances. Kerosene is particularly difficult to obtain.

In the Mid-Continent, contract business is absorbing practically all available products, and very few open spot sales are being made. Although tank cars are scarce, there is not at present any acute transportation problem, and refiners' stocks are fairly well adequate for meeting demand. However, some difficulty is experienced in filling orders of heating oils.

The Gulf Coast continues to be confronted with comparatively inactive markets, as tank cars remain unavailable in adequate numbers for meeting potential demand. Some refiners report that their storage is being filled near to capacity.

In the Western Pennsylvania refining district, the general market situation remains largely unchanged, with supplies of most products tight, but with neutrals still inactive and weak, although hopes of government business have given some support to that product.

Elk Basin Posting High for Neighborhood

Stanolind Oil & Gas Company has posted a price of 82 cents per barrel for Tensleep crude oil recently developed by Minnelusa Oil Corporation and Yale Oil Corporation at Elk Basin field, northern Wyoming. The price is 12 cents higher than posting for Frannie oil and reflects the higher gravity and quality of the deep Elk Basin crude. Stanolind has made connections to the discovery well with its 8-inch pipe line to the Standard Oil Company (Indiana) refinery at Greybull. It is expected that a dozen deep wells will be drilled in Elk Basin in 1943.

Alberta Production Quota Regulations Changed

Oil production permits are now being handled in Alberta on a new plan and the first compilation of orders under the new system issued by the conservation board of the provincial government became effective January 1. In the past the board issued a general order at the first of each month setting forth oil quotas for Turner Valley. Now the orders cover allowable oil production at individual wells. Separate orders are issued covering each well. In some cases instead of an oil quota, a gas quota is given and operators are permitted to experiment in efforts to obtain the greatest possible production of oil without exceeding the gas limit. The oil quota works out at an individually set number of barrels in T1 grade for periods varying from one day to as long as 60 days, and in some cases the allowance is on a daily basis. In the case of gas quotas the longest period covered in the first order is 120 days, there are also allowances for 90 and 70-day periods, and in two cases for as little as 7 days. The balance of the gas quotas are set on a 30-day basis.

Texas Hearing at Dallas Set for January 15

The Texas Railroad Commission has scheduled a statewide proration hearing for January 15, at Dallas. The meeting will be held in the Baker Hotel.

Beauford Jester, chaiman of the commission, said that the change was made at the suggestion of Houston oil men who could get better train connections to Dallas, and who thought that better hotel accommodations would be available while the legislature is in session at Austin. Jester said that the commission contemplated conducting the February meeting in Fort Worth and the March meeting in Houston. This is the first time the commission has

taken its statewide hearings away from Austin.

Jester wired Petroleum Administrator for War, Harold L. Ickes, asking for a February demand forecast in time for the hearing. In his wire to the secretary, Jester assured him that the East Texas salt - water - disposal operators would be able to take care of 200,000 barrels of water by February 1. If this estimate is correct, the field will be able to supply the additional oil necessary to the big-inch pipe line.

East Texas Trial

Meanwhile the commission planned to go to trial January 11 on cases involving the validity of its water-oil ratio order for East Texas. Chairman Jester said that several prominent attorneys had offered to assist the commission and were working on the case now.

Kansas and Texas Influence Output Drop

United States production of crude oil averaged 3,821,090 barrels per day in the week ended January 9. The output was 52,255 barrels per day lower than in the previous week, in reflection of substantial declines in Kansas and Texas.

Kansas averaged 256,400 barrels per day in the week of January 9, compared with 288,350 the week before. Texas declined to 1,329,200 daily from 1,377,700 the previous week, largely in consequence of a drop in the East Texas field to 327,950 from 350,850 and a decrease in the Lower Gulf Coast to 99,050 from 110,600. Oklahoma also showed a decrease—to 349,800 from 354,000.

Several states registered increases. Arkansas rose to 74,900 barrels per day from 73,600 the week before, California to 771,000 from 770,000, Illinois to 253,850 from 247,150, Louisiana to 339,850 from 316,100, Mississippi to 63,350 from 58,150. New Mexico was unchanged at 93,450.

Texas to Get in Line During Month

The Texas Railroad Commission has reported that the allowable as of January 1, 1943, was 1,393,435 barrels daily for the state. This is 2000 barrels in excess of the estimated allowable at the time the statewide order was issued. However, the full effect of the shutdown program is not yet apparent. With fewer producing days in January than were permitted in December, it is probable that the excess will be absorbed before the month is out.

Oil, Gas Law Lectures Scheduled at Houston "Y"

The South Texas School of Law's annual series of oil and gas lectures will be offered January 14 to April 29 at Houston, Judge E. E. Townes, dean of the school and vice president and general counsel of Humble Oil & Refining Company, has announced.

Instruction is given along practical, non-technical lines by some of Houston's most prominent oil attorneys at the night school operated by the Y. M. C. A. They will discuss such phases of the industry as leases, royalties, operating agreements, governmental regulations and operating rights. Classes will be held from 8 to 10 p.m. each Thursday.

Ohio Oil Company Takes Over Illinois Pipe Lines; New Corporation Formed in Texas

The Ohio Oil Company has announced the dissolution of The Illinois Pipe Line Company as of December 16, 1942, and formation of a new corporation known as The Illinois Pipe Line Company of Texas, December 15, 1942.

The old company was incorporated under Ohio laws November 27, 1914, and owned and operated a common carrier crude-oil-pipe-line business in Ohio, Indiana, Illinois, Kentucky, Montana, Texas and Wyoming.

Under the new incorporation the old Illinois company transferred to the new Texas corporation all of its pipe-line properties in Texas, consisting principally of its West Texas gathering system serving the Yates pool, Pecos County, and the East Texas gathering system serving the East Texas field, Rusk, Smith and Cherokee counties. Also effective on December 15 the old Illinois company became the owner of all the capital stock of the new corporation.

The old Illinois company wound up its corporate affairs December 31, 1942, and conveyed to The Ohio Oil Company all of its property and assets of every kind and character, including the transfer of all of the stock of The Illinois Pipe Line Company of Texas. At the close of business on December 31, 1942, The Ohio Oil Company took over all of the former Illinois company's pipe-line property in Ohio, Indiana, Illinois, Kentucky, Montana and Wyoming. The Ohio Oil Company has adopted all applicable tariffs and will engage directly in the common-carrier pipe-line business in these states.

The business is being conducted by and in the name of The Ohio Oil Company through a separate pipe-line department. The employes of the former Illinois company, except those located in Texas, are now employes of The Ohio Oil Company. In Texas they have become employes of The Illinois Pipe Line Company of Texas.

Charles Bunje, Jr., has been elected vice president of The Ohio Oil Company and appointed manager of the pipe-line department. O. F. Moore has been appointed assistant secretary and C. H. Gompf, assistant treasurer of The Ohio Oil Company.

Other appointments affecting The Ohio Oil Company's new pipe line department are: general superintendent, P. W. Hennessy; superintendent, Lima division of trunk line, P. E. Thompson; superintendent, Martinsville division of trunk lines, Oscar Jaco; superintendent, Bridgeport division, E. C. Welch; superintendent, Rocky Mountain division, R. M. Sackett; superintendent, communications system east of Mississippi River, R. M. Slough.

Directors and Officers Named

The directors and officers of The Illinois Pipe Line Company of Texas are as follows: directors: Charles Bunje, Jr., O. F. Moore, both of Findlay, Ohio; R. N. Montgomery, R. C. Gwilliam and Clayton L. Orn, of Houston, Texas.

Officers: president, Charles Bunje, Jr.; vice presidents, O. F. Moore and R. N. Montgomery; secretary, O. F. Moore; treasurer, C. H. Gompf; assistant secretaries, F. M. Carpenter and Clayton L. Orn; assistant treasurers, R. N. Montgomery and D. E. Winterrowd; cashier, G. B. Steile, of Houston.

It was also announced at the general office at Findlay, Ohio, that, effective January 1, 1943, H. F. Moran retired as manager of the Findlay and Mt. Pleasant (Michigan) divisions after 49 years of service with The Ohio Oil Company. Glenn Bish has been appointed manager of the Mt. Pleasant division to succeed Moran.

Argentina Output Equals Half the Country's Oil Needs

Argentina is meeting almost half of its petroleum requirements from its own wells, of which it has more than 3000, according to a review of the country's oil situation by the Coordinator for Inter-American Affairs at Washington.

Like other South American countries, the coordinator said, Argentina, second in area and population and first in per-capita wealth, has been dependent on outside sources for coal and most of its oil, but unlike most of its fellow republics, has an important oil production of its own, being ninth among the oil-producing nations of the world.

In 1942, a total of 364 wells were drilled of which 228 were drilled by the government petroleum agency, Yacimientos Petroliferas Fiscales. There are 19 refineries with an annual capacity of 30,000,000 barrels.

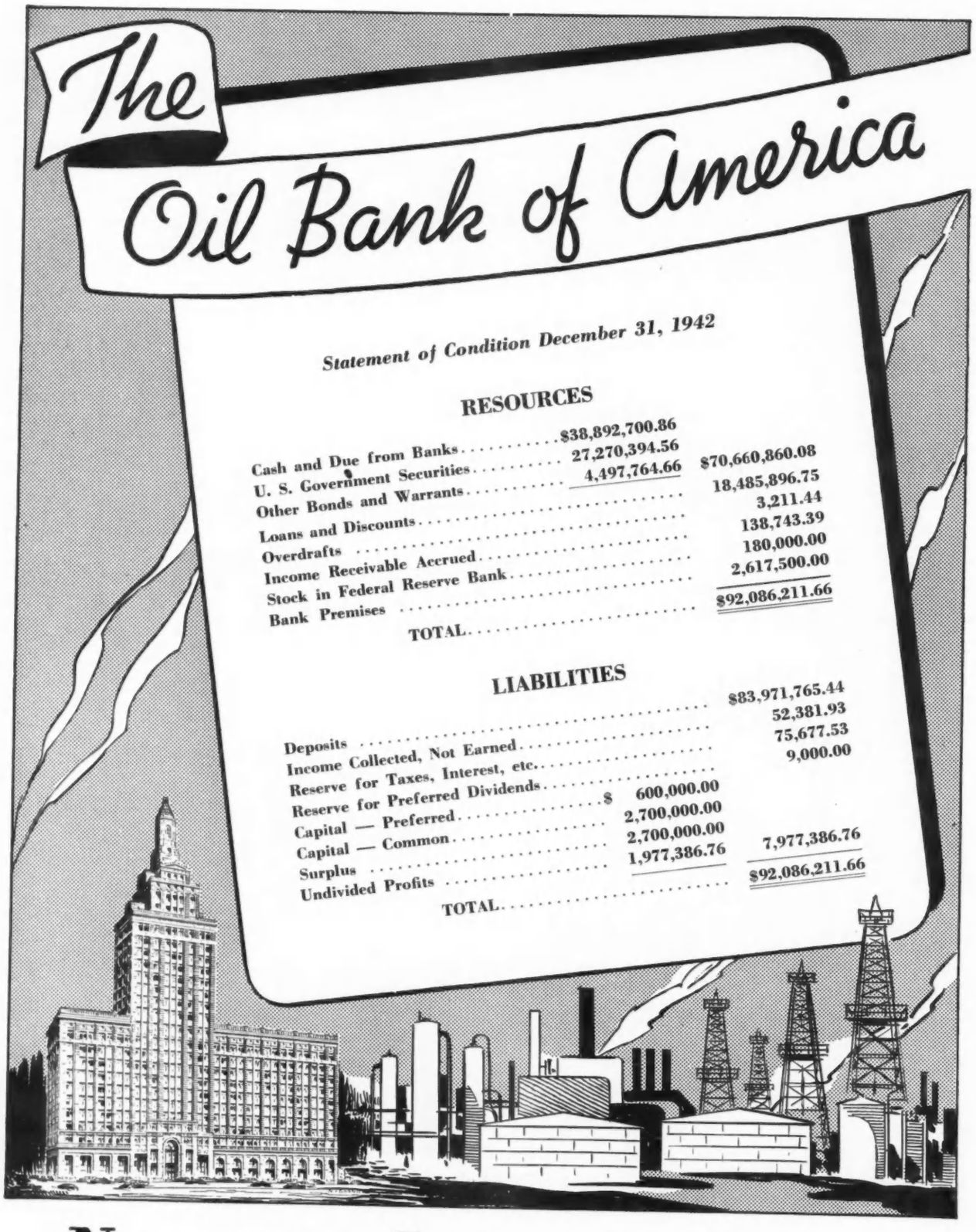
Argentina is reported to have 31 tankers and 17 drilling units. Recent acquisition of a 13,500-ton tanker brings the government's oil fleet up to about 85,000 tons.

Despite relatively large national production, Argentina still is compelled to import large quantities of oil required for its great network of railroads and industries and the largest number of motor vehicles of any of the South American republics, 307,935 in 1940. It is estimated that in normal times Argentina consumed 100 liters of gasoline per capita, against only 16 liters per capita for the rest of South America.

Total petroleum production in 1941 reached 3,499,757 metric tons, of which 2,226,800 tons, or approximately 64 percent, was government production and 1,272,957 tons private production. For the first six months of 1942, according to Argentina sources, production amounted to 1,842,790 metric tons.

An agreement recently was arranged with Bolivia for the delivery of 3000 tons of oil per day from the Bermejo wells through a pipe line to the Aguas Blancas refinery in Argentina.

While Y.P.F. distributes and sells at retail and for the past 11 years has maintained a price for gasoline, including tax, which approximates 21 United States cents per gallon, distribution is not limited exclusively to the government agency. Independent foreign companies, chiefly subsidiaries of Standard Oil Company (New Jersey) and Shell, also are in the field.



NATIONAL BANK OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

U. S. Field Operations

Illinois Basin

Madison County Has First Good Show In Devonian on West Side of Basin

Show of Devonian oil in Madison County wildcat. Test in Christian County, 30 miles from production may make producer. Casing set at Edwards County wildcat. Good show of oil found in sand at 510-20 feet in Flora pool of Clay County. North outpost to new Iola pool, Clay County, abandoned.

Madison County: Kingwood Oil Company's J. E. Niggli 1, NE NE NE 29-5n-5w, 8 miles northeast of St. Jacob, a wildcat, recovered 35 feet of oil and 90 feet of oil-cut mud in an hour's drill-stem test of Devonian lime at 1876-1901 feet. The operators are drilling below 2400 feet for Trenton lime. This test is the first on the west side of the basin to find a good show in the Devonian.

Christian County: M. Marlow et al's C. Ralph 1, SE NE NE 27-15n-2w, 12 miles southwest of Springfield and 30 miles from production, is testing Trenton lime at 1905-08 feet. The operators reported the hole was full of oil and that there was a good show of gas.

Edwards County: Burr Lambert's Nellie Van Schoick 1, NW SE NW 18-1n-10w, 6 miles southwest of the Edwards and Richland County line, has set pipe at 3138 feet to test Aux Vases sand at 3140-58 feet, following a successful drill-stem test.

Clay County: A W. C. McBride test in the Flora pool, Section 10-3n-7e, flowed during a drill-stem test of Pennsylvanian sand at 510-20 feet. Total recovery was 186 feet of clean oil and 310 feet of oily mud. The operators were drilling below 2175 feet to test Cypress sand.

The new Iola pool, where there are 13 operations, has been defined on the north with the abandonment of The Texas Company's I. J. Rush 1, SE SE NW 10-5n-5e, ½ mile from the discovery well. The test was dry through the McClosky lime at 2581 feet with no favorable shows reported in any formation.

Franklin County: E. S. Adkins' Peabody Coal Company 2, NW NE SW 18-7s-3e, near West Frankfort, has been abandoned at 2076 feet through the Tar Springs sand. It was near the company's Peabody 5, SW SW NW 18-7s-3e, which is being comp'eted in Tar Springs sand at 2037-58 feet.

Jefferson County: Roy Lee et al's Hopkins Community 1, Section 27-3s-4e, discovery well ½ mile northeast of Belle River, swabbed 14 barrels an hour after acidizing McClosky at 3077-89 feet. It swabbed 15 barrels of oil an hour natural. One location north of the discovery, the same operators are drilling below 2350 feet at J. M. McReynolds 1, SE SE 22-3s-4e.

Indiana

Vanderburgh County: Superior Oil Company's R. A. Nurrenbern 1, NW NW SW 32-6s-11w, in the Mt. Vernon Heights pool, set casing to test Waltersburg sand saturation at 1760-79 feet.

Kentucky

Henderson County: J. C. Miller and Nick Shirella are moving in materials for Ed Willett 1, NE SE SE 16-P-21, wildcat 2½ miles south of Smith Mills pool. Basin Drilling Company is contractor.

Carter Oil Company's S. T. Denton 1, NE NW SW 21-O-23, wildcat 3 miles west of Robards, was drilling at 1925 feet. Carter Oil Company's Henry P. Barett 1, NE NE NE 25-P-25, wildcat 3 miles east of Anthoston, was drilling at 2150 feet.

Union County: Carter Oil Company's J. P. Robinson 1, NE SE SE 20-P-19, on production test of Walterburg sand at 1796-1817 feet, made 65 barrels in 12-hour test. D. C. Bintliff's Charles Burbank 1, NE NE 20-O-17, 5 miles west of Spring Grove, has rotary derrick up but is shut down due to muddy roads.

Illinois, Indiana, Kentucky Completions on pages 55-56

Oklahoma

Two Oil Strikes Are Still Testing After Three Weeks

Discovery wells in Pottawatomie and Seminole counties, first indicated three weeks ago, are still testing. Creek County test deepening to Wilcox after slight showing of oil in Misener sand.

Pottawatomie County: Continental Oil Company and Kerlyn Oil Company's Weaver 1, NW NE NE 32-8n-3e, indicated as a Hunton lime producer three weeks ago, has received initial testing through 70 perforations at 4664-4680 feet in the pay. The well headed 50 barrels in 20 minutes after filling the hole in 2 hours. In 2½ hours it flowed 227 barrels through casing. No water was showing. Potential is yet to be taken. Strike is in the Macomb area, northwest of St. Louis.

Seminole County: Continental and Kerlyn's Scott 1, NW SW SW 3-10-7e, northwest of Sylvian production, which indicated good Hunton saturation three weeks ago in cutting returns, cleaned into pits with no estimate being made of the productivity. Lack of tankage has prevented complete testing of this discovery.

Creek County: Seismograph Service's Bedford 1, NW SW SE 26-15-10w, wildcat in the Slick area, is deepening to Wilcox after gaining a show in Misener sand. On swab in the shallow sand the well showed oil and some water which might succcessfully be cemented off if operators plug back.

Carter County: J. S. Batson's Goddard 1, SE SE NE 25-5s-1e, is a location nearly 1½ miles southeast of Noble Oil Company's Jolliff 1, discovery of Ardmore field.

Oklahoma Completions on page 57

Kansas

New Pool Indicated For Saline County

New pool indicated in Saline County. Week-old discovery in Barton County is being treated. Russell County test east of Fairport has favorable show. Two good field wells completed during week.

Saline County: Deep Rock Oil Corporation's Hunter 1, NE NW SW 20-16-1w, 4½ miles northeast of Roxbury field, McPherson County, is showing to make a well from Mississippi lime, hole having filled 1200 feet with oil from 2674-2683 feet natural. Roxbury produces from this formation. No water was showing, and testing has not been completed.

Barton County: Mid-Continent Petroleum Corporation and Tom Palmer's Harrison 1, NWc NE 18-20-13w, near Hiss pool, which one week ago swabbed 8 barrels ffrom Arbuckle at 3528 feet, is preparing to acid treat after gaining a temporary potential of 51 barrels daily of 36.5-gravity oil.

Russell County: Dickey Oil Company's Eulert 1, 2½ miles east of Fairport field, drilled better than average shows in Arbuckle lime at 3332-3335 feet and is running casing to test.

Pratt and Marion Counties: Two good field wells were completed during the week, the most noteworthy being Kuhn Bros.' Holub 2, C NE SE 32-17-4e, in the west extension of Lost

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Springs field, which initialed 150 barrels daily on incomplete test.

In Pratt County, Cities Service Oil Company's Beck 2, C SE NE 12-27-13w, Iuka field, produced 11 barrels hourly on first test into limited tankage.

Kansas Completions on page 56

South Dakota

South Dakota Drilling Expected to Continue

Although 29 deep tests have been drilled in South Dakota since 1920 without discovering oil in commercial quantities, government encouragement of wildcat operations is likely to bring further explorations this year, J. P. Gries, associate professor of geology at the South Dakota School of Mines at Rapid City, believes.

Drilling of four wells was begun last summer in the state and although work has been suspended on them for the winter, operations are expected to be resumed on at least some of them in the spring.

Of the 29 wells which have been drilled in South Dakota, Gries pointed out, 19 were drilled as a result of surface mapping of geophysical studies. The remaining 10 were located with no geological basis.

Oil tests have been made in 10 counties. Fall River County has had 7 tests; Custer County, 5; Butte, Meade and Pennington, 3 each; Harding, Stanley and Ziebach, 2 each, and Haakon and Jackson, 1 each.

Two tests were made between 1920 and 1925, 15 between 1925 and 1935; 1 from 1935 to 1940, and 11, some of which are still in progress, since 1940.

North Dakota has also been the site of several drilling tests. The most recent was Carter Oil Company's try in Oliver County, which was abandoned in September, 1942, at 8850 feet, after pre-Cambrian rock was encountered at 8831 feet.

Both North and South Dakota have been the scene of extensive oil- and gas-leasing operations for the last three years. About 7,000,000 acres are now under lease in the two states and investigating crews have been active in the states during the last three summers, including representatives of many of the country's major companies.

Carter Oil Company, The Pure Oil Company, Amerada Petroleum Corporation, Standard Oil Company of California, Geotechnical Corporation, and Independent Seismograph Service had crews in the Dakotas last summer.

Largest of the wells started in South Dakota last summer was a test by Continental Oil Company in Fall River County. Smaller companies started holes in Meade, Pennington and Fall River counties. Operations are expected to be resumed in the spring.

Nebraska Test Will Be Carried to Granite

Drilling operations have been resumed in a deep test on the Taylor ranch, near Neligh, Nebraska, with the arrival of additional drill pipe, F. D. Baxter, president of Baxter Drilling Company, which has the contract, has announced.

The hole, he said, will be drilled to granite in an "effort to find an even better producing zone than those already located. Casing will be set in the best zone and production started."

Test Being Drilled In Iowa; More Planned

A well is being drilled on the Guy Fry farm near Fairfield, Iowa, under the supervision of E. W. Hayes of Independence, Kansas, who has subleased a large tract leased last fall by Steinberger and Whiteside Company of Tulsa.

Similar tests will be drilled in other parts of Jefferson County in southeastern Iowa, Hayes said.

West Texas

Lower Permian Yields Small Well in Gaines

Gaines County wildcat is small producer in Lower Permian. Two Pecos County prospects reach contract depths, and location made for Ellenburger test on southwest edge of Yates field.

Gaines County: Shell Oil Company's Leaverton 1, four miles southwest of Wasson field, rated 150 to 200 barrels of oil daily on swabbing tests after two-stage treatment with 6500 gallons of acid in broken saturation at 7480-7772 feet. This zone is equivalent of a thick pay zone found in the Fullerton field, and is in the Clear Fork section of Permian. Additional acid treatments are slated for Leaverton 1 to try for flowing production.

Pecos County: Standard Oil Company of Texas' Smith-Douglas 1, C SE SE GC&SF 9, Blk 194, is to be started late this month as an Ellenburger test near the southwest edge of the Yates field. Magnolia Petroleum Company's Robertson 1, 13 miles north by west of Fort Stockton, halted at 7608 feet in Lower Permian, and will shoot nominal show of gas in San Angelo at 6475-6550 feet. Phillips Petroleum Company's Price 1, southeast part of county, reached original depth contract at 8500 feet, and was drilling black shale at 8590 feet. This wildcat may be carried to the Ordovician primarily for geological information as the company has assembled a vast area of leases between the test and Fort Stockton. Continental Oil Company's Claybrook 1, near Reeves County line, was fishing tools at 5380 feet after encountering gas at 5338-43 feet in Delaware sand, topped at 5268 feet.

Andrews County: Texas Pacific Coal & Oil Company's Jackson 1, southeast edge of Fullerton pool, flowed 1790 barrels initial to become the largest in the 12-well area. Total of 24,000 gallons of acid was used in the 6775-7245-foot section of Clear Fork.

Crane County: Magnolia Petroleum Company's Tucker 1, northeast offset to its McKee pool discovery, flowed sulphur water from Permian perforations at 3565-72 feet and will perforate oil-stained lime at 3350-70 feet. Tucker 1 previously tested sulphur water in Ellenburger at 6950-7204 feet. Gulf Oil Corporation's Estes 1, 3 miles west of Ordovician production in Sand Hills field, had failed to encounter deep shows in drilling to 6164 feet.

Hockley County: Protection string of 7-inch pipe was cemented at 5102 feet by Jerry Hawkins et al's Mallet 57-A, contracted 6500-foot wildcat on the north rim of Slaughter field.

West Texas Completions on page 59

East Texas

Nacogdoches County Well Important Gas Strike

Prolific gas-distillate strike by Nacogdoches County's deepest test. Wildcats assigned Kaufman and Van Zandt counties. Fourth prospect in Friendship area, Smith County, entered Georgetown structurally low.

Nacogdoches County: The Texas Company's Strahan 1, M. J. Ariola Survey, 7 miles northeast of Nacogdoches, confirmed new source of high-pressure sweet gas in producing at the rate of 15,000,000 to 20,000,000 feet daily, with spray of straw-colored distillate, from perforations in Travis Peak porosity at 8615-60 feet, total depth 9295 feet. This preliminary gauge was taken with drill-stem packer at 8579 feet, and open flow is due to be considerably greater. No test has been made of Pettit topped at 8019 feet. Elevation is 447 feet.

Bowie County: Bowlen et al's Simms 1, Smackover-lime prospect, recovered parted drill stem, then lost fishing tools. It is bottomed at 8609 feet in Cotton Valley.

Wildcat Starts: Royal Petroleum Corporation's Key 1, southeast corner of Wm. Willis Survey, 2 miles southeast of Wills Point, will try for Paluxy production. In Kaufman County, Elbert Williams' Berryman 1, 2 miles southeast of Kemp, will drill to the Woodbine.

Smith County: B. F. Phillips et al's Starnes 1, 1¼ miles northwest of Friendship, entered Georgetown at 4235 feet, elevation 407 feet, and was drilling lime at 4305 feet. Iowa Payne Oil Company's Murray-Humble 1, 1½ miles northwest of Noonday, was drilling at 3950 feet in Pecan Chalk, topped at 3910 feet, elevation 512 feet.

East Texas Completions on page 59

North Texas

Discovery Wells Completing In Jack and Clay Counties

Discoveries in Jack and Clay counties. East outpost for Walnut Bend field finds production in Simpson after yielding water from Strawn series.

Discoveries: Hanlon & Buchanan, Inc.'s Ellis & DuBose 1, Lot 6, J. W. Williams Survey, Jack County, and 1¾ miles southwest of Hoefle pool, flowed 452 barrels of 43-gravity oil on ¼-inch choke, based on 6-hour test, from Bend at 4785-4828 feet, after 3000 gallons. Top of Bend is 79 feet high to nearest producer in the Hoefle 12-well pool. Acreage between the two pools has not been explored for deep production.

Clay County recorded its ninth producing area from Bend lime and conglomerate series when Roy Lee, Trustee's Maddox-Shell 1, T. M. Hughes Survey, 10 miles north of Spring pool, swabbed 160 barrels of 40-gravity black

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THE OIL WEEKLY

oil on initial test after two-stage treatment with 15,000 gallons of acid through perforations at 5476-5506 feet in Bend, topped at 5461 feet. No test has been made of Ellenburger dolomite at 5583-5672 feet. This discovery is 45 feet low on Bend and 71 feet low on Ellenburger when correlated with Shell Oil Company's junked prospect, situated ¼ mile southwest.

Cooke County: Sinclair Prairie Oil Company's Winger 1, northwest corner of Section 70 and ¼ mile east of Strawn production in the Walnut Bend field, which ranks third for production in the district, yielded 2830 feet of oil and no salt water when tester used in Simpson at 5503-5550 feet. Pipe will be run for completion. Winger 1 tested water in the regular Strawn oil zones. It is 1½ miles east by south of nearest Simpson production.

Jack County: Deep explorations in the county have attained sizeable proportions lately, and a number of tests are nearing decisive levels. Shell Oil Company's Wolfe 1, 3½ miles southeast of Jermyn, resumed drilling after proving dry when tester was used at 4357-4404 feet in Bend, topped at 4342 feet. Barnsdall Oil Company et al's Garrison 1, Thomas Nash Survey, was drilling at 5810 feet with top of Mississippi called at 5663 feet. Joe Worsham et al's Meador 1-a, Lot 22, Blk 1, Henderson CSL and twin to a junked wildcat, was to deepen after testing a small volume of gas through casing from sandy-lime at 5260-69 feet. Youngblood & Foree's Cherryholmes 1, 10 miles northeast Jacksboro, was drilling lime at 5840 feet.

North Texas Completions on page 59

Southwest Texas

New Sands Being Tested In Four Scattered Counties

Operators are showing more interest in drilling developments on proven and semi-proven acreage as a result of opening of new sands. Four new sands are being tested in Jackson, Duval, McMullen and Starr Counties. Wildcatting continues to remain normal although increase expected due to efforts to show gain in reserve picture.

Jackson County: First new sand discovery for the year is credited to Mayo field with Lonnie Glasscock completing a producer in Marginulina. Heard 1 was perforated at 5128-38 feet and flowed 38 barrels daily through 7/64-inch choke, showing 1500 pounds pressure on tubing and 1900 pounds on casing. The field has two other producing areas, one in the Marginulina and the other in Frio. The well is in south corner of northwest 202-acre tract, James Cummings survey 13, northeast of production.

Duval County: Taylor Refining Company has opened production in Hockley sand at Cadena with Cadena 2, 990 feet east of the discovery well. Perforated at 4563-68 feet, the well flowed 198 barrels daily through 3/16-inch choke with 240 pounds pressure on tubing, casing sealed. The well is in Callentano Rios survey 306.

McMullen County: Argo Oil Corporation is attempting to open production in Government Wells sand at South Campana with Edrington Estate 2-G flowing oil and wash water from perforations at 2609-10 feet. The new sand producer is ½ mile east of Pettus sand production, and is in SWc NW SW AB&M 63. This is the first well to produce from the new horizon in this area.

Starr County: Sun Oil Company is testing a new sand in Frost field with perforations having been made at 5004-08 feet, deeper than the regular pay at 4194-4200 ft. Total depth is 5409 feet with 5½-inch casing set to 5074 ft. The well is northeast of the discovery and is in Porcion 97 of Y. Trevino survey.

Duval County: George W. Strake apparently is opening a field four miles northwest of Fitzsimmons field. Ira Yates 1 is testing in Pettus sand logged at 3691-3731 feet, gas odor found in top portion and oil odor in bottom part. Drill-stem test at this level recovered 220 feet of 42-gravity oil and 45 feet of oil-cut mud in 25 minutes. The Government Wells sand cored at 3142-70 feet carried no odor but showed gas on test. This discovery is in SA&MG survey.

Jim Wells County: Great Lakes Carbon Corporation and Coastal Refineries are completing Wulff 1, southwest outpost at Koopman, as a gas-distillate producer. Perforations were made at 5681-91 feet after failing to flow satisfactorily from old perforations at 5974-77 feet. The field discovery produced oil from Frio at 4100-foot level and a second well has been completed northeast of the discovery as a gas well in the 4700-foot horizon.

Southwest Texas Completions on page 58

Texas Gulf Coast

McCarthy Completes Major Extension to Stowell Field

Although it has been 42 years since the first large oil field was opened in Texas at Spindletop, regarded as the bellwether of the discovery parade in the state, a new field in Jefferson County—the birthplace of the oil industry in the Southwest—looms as a major producing area. The new development is at Stowell, a field opened to production in December, 1941, but which was given a two-mile extension last week with completion of a well for 486 barrels daily. As a result of the extension, adding several hundred more acres to production, more interest is being shown in old prospects in the county. An operator has staked a deep wildcat north of Port Arthur while other wells are reported to be in the "leasing and trading mill."

More Cockfield sand development is in store for Fostoria area, Montgomery County, although the prospect has proved disappointing so far as a Wilcox-sand producer.

Jefferson County: Glenn H. McCarthy has completed Hankamer-McLean 1, wildcat two miles north of Stowell field and in Winnie area as a 486-barrel producer from Frio sand. The flow was through 11/64-inch choke with 1325 pounds pressure on tubing and 1460 pounds on casing, gas-oil ratio of 525-1. The well was drilled to 8624 feet and 7-inch production pipe was set to 9727 feet. Perforations were made at 7836-46 feet.

Although not officially confirmed, the well is credited with having more than 120 feet of sand capable of producing which would give the field a sand thickness not present in many coast areas.

The prospect was drilled on geophysical and subsurface information. Three

dry holes have been drilled northerly from the producer, all indicating a structure in the area. Principal leaseholders are Glenn H. McCarthy, The Texas Company, Earl C. Hankamer, A. C. SoRelle, et al.

In Stowell field proper on the southwest side, Sinclair Prairie Oil Company is preparing to drill a 9100-foot test. It is Ida J. Smith 2-A on a 323-acre tract in T&NO 161, Abstract 373. If the well reaches its objective it will penetrate the field's four sand horizons —all in Frio section.

Brown & Wheeler have completed Crawford 3 at Stowell for 178 barrels daily through 9/64-inch choke. Perforations were made at 8878-88 feet. Total depth is 9205 feet with casing cemented at 8920 feet.

Wildcat: Glenn H. McCarthy is spudding Shelby et al 1, wildcat west of Port Arthur in Jefferson County. The well will be a deep Frio-sand test and is located 667 feet from east line and 150 feet from south line of T&NO 11. Company rig will be used.

Montgomery County: J. A. Gray of Houston has staked a Cockfield sand test in the Fostoria field area, an area that originally was drilled by Atlantic Refining Company as a Wilcox prospect but which has proved unsuccessful from this deep horizon so far. The latter company's Foster 1-A was drilled to Wilcox, but was plugged back and completed as a pumper from Cockfield. Gray's well is Foster Lumber 1, west of Atlantic's well, and is on a 40-acre tract in Presley Gill survey. Projected depth is 6000 feet.

Harris County: Another wildcat in north part of county, where gas and distillate production is the rule, indicates this type of production with O. W. Killam, Laredo operator, testing M. A. Dodd 1 in a gas and distillate sand at 6557-6582 feet. Operator is due to drill deeper after making a drill-stem test of this level. Location is in WCRR 13, six miles north of Addicks.

Wharton County: Continental Oil Company apparently is opening a new gas field eight miles north of Louise with Allenson et al 1 flowing dry gas from perforations in the 4400-foot sand section. Hole is bottomed at 5523 feet with 7-inch flow pipe set to 4430 feet. The discovery is in WCRR 41.

Texas Gulf Coast Completions on page 58

Louisiana Gulf Coast

Drilling Pushed to Supply Cycling Plant at Erath

Recovering from a year-end slump in drilling and production activities, wildcatting is showing an upward trend with new deep tests projected to start immediately. Field development shows signs of renewed activity with drilling at Erath in Vermilion Parish increasing to supply a cycling plant. Official gauge was run on discovery at Krotz Springs in St. Landry Parish.

Erath: Drilling at Erath, Vermilion Parish, is being conducted on a large scale with The Texas Company operating three rigs and having locations for three more wells. These wells produce distillate from below the 10,000-foot level with the producing range being between 8700 feet and 11,650 feet. Purpose of the drilling program is to supply gas and condensate to a new cycling plant. Principal lease owners are Phillips Petroleum Company, The Texas Company, Humble Oil & Refining Company and Tide Water Associated Oil Company, who unitized acreage to utilize the large gas and distillate reserve.

The field was discovered in April, 1940, producing from Miocene sand, the possible producing sand having a thickness of approximately 100 feet. The structure is believed to be a deep-seated dome, and with drilling costs running around $4.50 per foot, considerable expenditure will be made to develop the acreage to supply the plant. The two new unit locations are out of the northeast corner of Section 21-13s-4e. The Texas Company already has rigs running in Sections 22 and 17, two of the wells being near the 10,000-foot level.

Wildcatting: Atlantic Refining Company has projected a deep test on North Jeanerette prospect in St. Mary Parish, the wildcat to be carried below 10,000 feet. Location is on H. M. Stagg's Adeline Sugar Factor Company acreage, spotted 1980 feet south and 660 feet west of northeast corner of Section 19-13s-9e. The well is due to make thorough test of Miocene sand, a horizon productive in many coast fields.

East Baton Rouge Parish: Markey & Bankhead of Houston are preparing to drill an Oligocene test east of University field, McnInis 1. Known as McInnis prospect, the well is in Section 58-7s-1e. On south edge of Pine Prairie dome in Evangeline Parish, Roy Lee, Trustee, is preparing to drill a flank test, the well being Crowell-Spencer Lumber 2, south of northwest corner of NE 2-4s-1w. The south side of this large dome has been the site of considerable drilling in past eight months with The Texas Company opening Sparta production on the southeast flank and C. & I. Production Company tapping a similar pay sand on southwest side.

St. Landry Parish: The Krotz Springs prospect in St. Landry Parish has been opened to production with Gulf Refining Company completing Haas-Hirsch 1 as last discovery on the coast for 1942. The well on official gauge flowed 358 barrels of 50.2-gravity oil or distillate daily through 5/16-inch choke from perforations at 9316-36 feet. Tubing pressure was 2750 pounds. Location of this well is in Section 21-6s-7e on approximately 3000 acres Gulf owns in the area. Total depth of hole is 11,398 feet with casing set to 10,027 feet.

Louisiana Gulf Coast Completions on page 56

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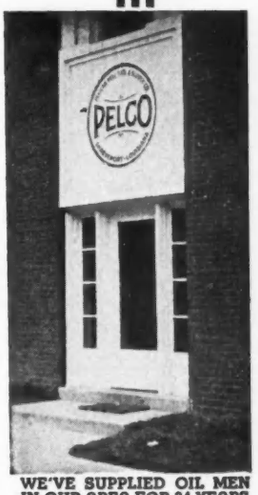

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North Louisiana

Sugar Creek Extension Will Require Pump

Carter Oil Company's Stevenson-Kilpatrick 3, NW SW 12-19n-6w, a ¼-mile extension of the Sugar Creek field, Claiborne Parish, failed to either flow or swab in for any period longer than 11½ hours, making 56 barrels of 34.9-gravity oil during that period. Saturation was encountered at 5765 feet, and casing was perforated at 5770-84 feet. Bottom is at 6201 feet, plugged back to 6075 feet. Pumping unit will be installed for further production efforts.

Roy Lee, Trustee's Richard Sapp 2, NW NW 18-19n-5w, tested 4 barrels per hour from perforations at 5784-5806 feet, through various chokes. Same operator probably will abandon Richard Sapp 1, same section, where a workover job failed.

Natchitoches Parish: George H. Echols abandoned Goodpine 1, wildcat in C NE NE 13-13n-8w, a second time, at 9932 feet in black shale. A section 2500 feet thick from below Travis Peak to Cotton Valley formation where numerous sand sections were tested revealed no worthwhile commercial show. Echols temporarily abandoned Goodpine 1, at 5520 feet, some time ago when salt water in drill-stem test was the recovery at that horizon.

North Louisiana Completions on page 56

Arkansas

Columbia County Wildcat Flowing From Smackover

Columbia County has new Smackover-lime field. Pettit-lime producer extends Haynesville field into Arkansas.

Columbia County: The eighth deep Smackover-lime pool for Columbia County, Roy Lee, Trustee's, Pickler 1, C SW NE 23-17s-21w, wildcat discovery, swabbed and flowed, in a three-hour test, 15 barrels of brownish oil and distillate per hour through 7/64-inch tubing choke with tubing pressure at 2100 pounds. Casing pressure stood at 2200 pounds during this period. Salt water gave operators trouble at 8878 feet. The hole was drilled below 8900 feet, but nothing worthwhile showed up at the lower level. Water flow under control, operators perforated the pipe in Smackover lime saturation at 8851-64 ft. Official gauge has not yet been made at the discovery but the latest flow test unloading into storage tanks showed an average of 5 barrels per hour of 50-gravity fluid through a 1264-inch tubing choke with 2500-pound pressure on casing and 2200 pounds tubing pressure.

It has been announced that an allowable of 200 barrels per day will be given the field opener. The new producer is approximately midway between Big Creek gas-condensate production and the Magnolia field.

Rig has been moved from the discovery to take the Pickler 2 test located in the same section to the Smackover lime. The new field is one mile south of the city limits of Magnolia.

Haynesville Extension: Navarro Oil Company's J. S. Beene 1, C SE SW 10-20s-20w, extending Haynesville field, Claiborne Parish, Louisiana into Arkansas, flowed an average of 10 barrels per hour, after acid treatment, from Pettit lime zone at 5463-78 feet. During test a 1-inch choke was used. Flow will be choked back to daily allowable of 127 barrels. The extension is producing from the same horizon as the Haynesville field proper.

Site is being cleared and Navarro Oil Company will drill J. S. Beene 2, a Pettit lime test, in the same section. Rules outlined for the Haynesville field proper will be used in developing the new area.

Arkansas Completions on page 55

Rocky Mountain States

Eastern Colorado Test Fails; Pilot Butte Disappointment

Hopes of discovering a major oil field in the eastern plains region of Colorado were further dimmed as Ramsey Petroleum Corporation abandoned Graham 1, SW SW 14-7n-59w, at 7000 feet, after developing 2000 feet of water from Lakota sands at 6815-25 feet. Well cored 1 foot of saturated Dakota at 6735 feet, drilled hard tight formation to 6762 feet where it went out of the Dakota. Saturated Muddy sand at 6652-64 feet failed to show a commercial well on drill-stem test. Location is a third of a mile south of Ramsey's St. Anthony 1, completed several years ago for a gasser in Muddy and later abandoned and which was believed to be edge well on oil structure trending southeast.

Pilot Disappointment: Broderick & Grodon's Fidelity Trust 1, C EL SW SW 27-3n-1w, 2 miles south of the recent deep discovery in the Pilot Butte field, Wyoming, developed a hole full of water from Tensleep sand and is plugging back from 6259 feet to perforate 7-inch casing set through the Muddy sand topped at 3280 feet. It showed for 10.0 gas on drill-stem test from Muddy.

Wyoming Completions on page 59

Michigan

Winter Difficulties Slow Field Operations

Adverse weather adds further difficulties to Michigan operations with several wildcats snowbound.

Roscommon County — Headquarters: Sun Oil Company's State A-2, N½ NW SW 33-21n-3w, first Richfield lime test in the field, drilled the horizon dry but is still being deepened at 5521 feet. Richfield top was tentatively set at 5254 feet.

Missaukee County—Wildcat: Sun Oil Company's State A1, Section 11-23n-5w, Enterprise Township, after the third squeeze cement job at a temporary plug at 3443 feet, was perforated with 91 shots without immediate results. Shot section is in the Dundee.

Clare County—Wildcat: Gulf Refining Company's Oman 1, C NW NW 8-17n-4w, Grant Township, logged Dundee lime at 3904 feet, and cored to 4040 feet with a show of salt water at 3960-70 feet. It may be carried to Detroit River lime.

Michigan Completions on page 56

California

Pollution of Reservoir Points for Test Location

Credit for an oil field discovery may go to an artificial lake if an unusual project just launched here turns out successfully. Lake Chatsworth, a large water storage reservoir in the northeast outskirts of Los Angeles, was filled 11 years ago by the city water and power bureau. Two years ago oil impregnation of the water occurred, necessitating its abandonment as a source of supply.

Ramsey Petroleum Corporation of Los Angeles assigned geologists to study the phenomenon and survey the immediate area. The result was a favorable report indicating the presence of a structure. The Ramsey interests proceeded to negotiate with the city for drilling rights, and it is announced a satisfactory contract has been closed, with the prospect that an initial location would be staked in the near future.

The venture is a most promising one for the city because if production is obtained the municipality falls heir to valuable royalties; and also geologists have given assurance that oil wells would provide relief from bottom pressure now responsible for the seepage, and thus stop pollution. Any drilling in the lake area proper will be by whipstocking.

Fresno County: Tide Water Associated Oil Company is preparing to drill a wildcat, 11-A, 3-21-15, in the Coalinga area.

Kern County: The Texas Company has staked location for Bowerbank 6, wildcat in 6-29-24, Bowerbank area.

In the McFarland area, Tide Water's wildcat, Strine 1, 32-15, 15-26-26, is being abandoned in gray sand at 6529 feet.

Reserve Oil & Gas Company's Reserve 34-1, wildcat in 34-11-19, recovered only muddy fresh water from 25 feet of oil sand topped at 4599 feet and is drilling at 4812 feet.

Standard Oil Company of California, in a program for extensive development of old properties aimed to increase low-gravity production, has announced six additional new locations in the Buena Vista field.

Chanslor Canfield Midway Oil Company's 25-1, wildcat in 1-32-22, Northwest Midway, is being abandoned in hard brown shale at 5524 feet. Formation test at 3152-3325 feet netted only mud and brackish water.

Two tests in the Shale Hills-Devil's Den area proved unsuccessful. Continental Oil Company's wildcat Mabury 3, 26-26-18, bottomed in hard shale at 5164 feet, was abandoned. Devil's Den Oil Company abandoned McCadden et al 2, 26-25-18, at 585 feet.

Los Angeles County: In furtherance of its new policy of developing added production on inside properties of old shallow fields, Standard Oil Company has located 10 new wells on the Baldwin properties, Montebello field.

Flintkote Company's No. 1, wildcat test in Turnbull area located 300 feet south and 100 feet east of center line of Palm Ave and Turnbull Canyon Road, proved unsuccessful and was abandoned in hard gray sand at 3653 feet.

California Completions on page 55

United States Well Completions

ARKANSAS WILDCAT

Nevada County: Hunt Oil Co. et al's Kirk 1, c nw se 33-12s-20w, abnd, 3348 ft.

CALIFORNIA

Fresno County—Coalinga Old Field: Shell's 167-34, 1041 ft n, 1660 w sec 34-19-15, black shale 2278 ft, Kreyenhagen 2674 ft, perf 2296-2523, 2535-2674 ft, pump 68 bbls, td 2687 ft.

Fresno County—Riverdale: Amerada's Zanolini 36-23, 1065 s, 1650 e w¼c 23-17-19, perf 6645-6665 ft, 14/64-in, 2100/2050 lbs, flow 139 bbls 43.4-gr, td 6900 pd 6845 ft.

Kern County—Belridge-South: Belridge's 35A-33, 235 ft s, 791 w nec 33-28-21, pump, no est.

Belridge's 15A-33, 2250 n, 405 e swc 33-28-21, pump 20 bbls, perfs 402-630 and 698-810 ft, td 810 ft.

General's 2A-3, 235 ft s, 791 w nec 3-29-21, pump 82 bbls 20-gr, perfs 411-537, 561-793 ft, td 796 ft.

Kern County—Coles Levee: Richfield's KCL C-63-34, 1625 ft s, 1661 w nec 34-30-25, flow 2625 bbls 34.9-gr, 2-1½ in, 740/50 lbs, 199 ft perf 9335, td 9340 ft.

Kern County—Fruitvale: Western Gulf's Red Ribbon 14, 1654 ft n, 2332 w sec 27-29-27, pump 53 bbls 15.4-gr, perfs 4320-4300, 4280-4260, 4250-4220, 4070-4040, 3900-3860 ft, td 4448 ft.

Kern County—Kern River: Tide Water's Reed Crude 72, 640 ft s, 380 e nwc 32-28-28, pump 5 bbls 14-gr, 197 ft perf 1025 ft, td 1025 ft.

Kern County—Lost Hills: Universal Cons. Oil Co.'s 24-D, 1710 ft s, 440 w nec 30-26-21, pump 66 bbls 18.1-gr, 567 ft perf 1547 ft, td 1561 ft.

Kern County—Midway-Sunset: Chanslor-Canfield's 24-25, 650 ft n, 840 e w¼c 25-31-22, pump 30 bbls, 260 ft perf 2370 ft, td 2456 ft.

Chanslor-Canfield's 48-9, 780 ft n, 1505 e swc 9-32-23, pump 28 bbls, td 1570 ft.

Union's Midway-Northern 2, 233 ft n, 535 e s¼c 7-11-23, pump 160 bbls 11.6-gr, 60 ft perf 1898 ft, oil sand 1655 ft, td 1935 ft, pd 1900 ft.

Kern County—Mount Poso: Chanslor-Canfield's Mon 17, 889 ft s, 2389 e nwc 26-27-28, pump 58 bbls 15.5-gr, 60 ft perf 1565 ft, Vedder 1519 ft, td 1565 ft.

Ring Oil Co.'s Bowles 14, 233 ft s, 872 e nwc sw 29-26-28, pump 100 bbls, 25 ft perf 1730, td 1730 ft.

Kern County—Poso Creek-Premier: Standard's 10-9, 327 ft s, 984 e nwc 9-28-27, pump 181 bbls, perf 2519-2794 ft, td 2795 ft.

Kern County—Round Mountain: D. G. Vedder's Bell 8, 240 ft n, 240 w e¼c 12-28-28, pump 82 bbls 14.5-gr, 32 ft perf 1780 ft, Grit 1746 ft, Vedder 1755 ft, td 1780 ft.

Los Angeles County—Wilmington: Long Beach Oil Dev. Co.'s "W" 38, 393 nely along n line Seaside from e line 27th, thence 2346 ft sely at r/a, pump 164 bbls 16.3-gr, perf 3361-3526 ft, td 3648 ft, pd 3531 ft.

Morton & Dolley Grant 1, 275 ft s, 130 e of c/l State & Gulf sts, pump 160 bbls 16-gr, 503 ft perf 3715 ft, td 3715 ft.

Pongratz Pet. Co.'s Spring 2, 440 ft n along c/l Eudora from c/l "Q" st, thence 130 ft wly parallel to "Q," pump 85 bbls 17-gr, perfs 3277-3450, 3519-3672 ft, td 3680 ft.

Santa Barbara County—Santa Maria Valley: W. R. Gerard's Acquistapace 1, 330 ft n, 330 e swc se sw 22-10-34, flow 20 bbls oil, 10,000,000 gas, back to 10/64-in, 700/800 lbs; shut in for gas traps, td 4379 ft.

Hancock & Bush's Wylie 5, 330 ft n, 330 e swc 30-10-33, pump 128 bbls 14.2-gr, 667 ft perf 4870 ft, td 5027 ft.

CALIFORNIA WILDCATS

Fresno County—Coalinga area—Failure: Texas Co.'s Boychester 83-18, 999 ft n, 380 w e¼c 18-21-5, Cretaceous 4326 ft, abnd 4351 ft.

Kern County—Devil's Den area—Failure: Devil's Den Oil Co.'s McCalden et al, 435 ft s, 330 w nec sw ne 26-25-18, abnd 585 ft.

Los Angeles County—Failure: Union's Newhall Land & Farming 1, 990 ft n, 2791 e swc 20-4-17, abnd 7004 ft.

ILLINOIS

Clay County: Texas Co.'s Bloemker 2, nw se ne 4-5n-7e, Weller 2502-12 ft, 261 bbls, 2520 ft.

Texas Co.'s Bloemker 3, nw nw ne 4-5n-7e, Weller 2511-23 ft, 53 bbls, 2523 ft.

Effingham County: Carter's Claggett 1, s½ nw nw nw 6-8n-4e, Weller 1545-52 ft, 24 bbls, 1552 ft.

Fayette County: Ohio's C. T. Williams 16, nw se nw 36-6n-2e, Weller 1600-06 ft, 18 bbls, 1613 ft.

Carter's Ireland 16-D, c se ne 32-8n-3e, Dev 3112-17 ft, 100 bbls, 3117 ft.

Franklin County: Armstrong & Day's Roberson 1, sw ne sw 1-6s-2e, abnd 2878 ft.

Gallatin County: Gulf's Bahl 1, nw ne sw 15-8s-9e, Weller 2483-2509 ft, 159 bbls, 2511 ft.

Cherry & Kidd's Kerwin 20, ne ne nw 14-8s-10e, T.S. 2042-2060 ft, 40 bbls, 2061 ft.

Hamilton County: Tide Water's Lynch 1, c e½ se sw 16-4s-7e, A.V. 3288-3324 ft, pb 3310 ft, 7 bbls, 3481 ft.

Magnolia's Travis 3, ne sw se 20-4s-7e, abnd 3329 ft.

Texas Co.'s Shavitz 4, sw sw sw ne 27-6s-6e, gas input, 3101 ft.

Jasper County: Pure's Miles 4, c e½ sw nw 18-5n-10e, McCl 2904-2909 ft, 487 bbls, 2930 ft.

Sun's Harding 1, se ne ne 26-5n-10e, abnd 3057 ft.

Jefferson County: Lario O&G Co.'s Mountain-Mateer 2, c n½ ne se 36-2s-4e, abnd 3054 ft.

Texas Co.'s Baker 1, c sw se ne 33-3s-3e, McCl 2881-84 ft, A.V. 2734-60 ft, L. O'H. 2778-96 ft, McCl 2836-62 ft, 137 bbls, 2890 ft.

Lawrence County: Brinkerhoff Drlg. Co.'s Putman 1, sw se ne 23-2n-12w, Biehl 1357 ft, 138 bbls, 1378 ft.

Smith & Nye's Spidel 5-B, w½ ne nw se 23-2n-12w, abnd 1405 ft.

Marion County: Swan King Oil Co.'s Carsarette 1, ne se ne 35-4n-2e, abnd 2139 ft.

Richland County: Roy Lee, Trs.'s John Miller 1, ne sw nw 11-4n-14w, abnd 3057 ft.

Pure's Omer Sayre C-1, sw sw se 11-4n-9e, abnd 3040 ft.

Wabash County: W. E. Ballor's Liddle 3, nw sw sw 26-1n-13w, Biehl 1759-1769 ft, 50 bbls, 1771 ft.

Hayes & Wolfe's Newkirk 1, sw sw sw 26-1n-13w, Biehl 1748 ft, 50 bbls, 1771 ft.

W. E. Ballor's Michael 3, nw nw nw 35-1n-13w, abnd 1766 ft.

Navajo Oil Co.'s Grey 2, nw ne se 30-2s-13w, Cyp 2461-68 ft, 85 bbls, 2468 ft.

W. W. Grey, Est.'s Fee A-37, c s½ nw sw 14-3s-14w, A.V. 2776-2798 ft, 25 bbls, 2804 ft.

Wayne County: Pure's May Clutter 1, c nw nw 11-1n-7e, abnd 3264 ft.

Sun's Mauck 4, c sw nw 20-1s-7e, L. O'H 3224-27 ft, 207 bbls, 3227 ft.

Carl Robinson's Shaffer 1, sw nw sw 29-2s-9e, abnd 3418 ft.

White County: Superior's Lomas 4, nw ne sw 14-4s-14w, Walt 2138-45 ft, Tar Spg 2232-2243 ft, 56 bbls, 2243 ft.

Skelly and McBride's Stone 2, sw sw se 7-4s-10e, A.V. 3073-93 ft, 432 bbls, 3094 ft.

Skelly's Barbre A-2, nw ne ne 18-4s-10e, T.S. 2457-65 ft, 72 bbls, 2500 ft.

Jarvis Bros. and Marcell's Cleveland 3, ne se se 36-4s-10e, T.S. 2284-2329 ft, 220 bbls, 2329 ft.

Jarvis Bros. and Marcell's Garnes 1, sw se nw 31-4s-11e, T.S. 2327-38 ft, 30 bbls, 2348 ft.

Jarvis Bros. and Marcell's Spencer 10, ne ne se 36-4s-11e, T.S. 2324-37 ft, 550 bbls, 2337 ft.

Pure's Pyle Consol. 3, se se se 18-6s-9e, Pt Crk 2763-2842 ft, pb 2844 ft, 140 bbls, 2938 ft.

Kingwood and Sinclair Wyoming's Hale

Wells Completed in the United States in Week Ended January 9, 1943

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

STATE OR DISTRICT	FIELD COMPLETIONS: New Wells: Oil	Gas	Distillate	Water Input	Gas Input	Water Disposal	Dry	Total	Old Wells Drilled Deeper: Oil	Gas	Dry	Total	WILDCAT COMPLETIONS: Oil	Gas	Distillate	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Arkansas																1	1	1		1	4
California	20	1						21								3	3	24	21	45	40
Colorado																			3	3	
Illinois	24				1		12	37	1			1				7	7	45	36	81	114
Indiana		1					1	2								3	3	5	2	7	20
Kansas	20	2				1	1	24	1			1	4			16	20	45	22	67	103
Kentucky	3						2	5								1	1	6	3	9	11
Louisiana	8	1						9					1				1	10	6	16	53
North Louisiana	1	1						2										2		2	
South Louisiana	7							7					1				1	8	6	14	
Michigan	2						1	3								1	1	4	10	14	37
Montana																			12	12	4
New Mexico	3							3										3	5	8	7
New York	11			6				17										17	18	35	33
Ohio	4	13					6	23										23	19	42	62
Oklahoma	9	2					8	19	1		1	2		1		18	19	40	32	72	82
Pennsylvania	39	4						43		2		2						45	48	93	8
Texas	28	1			1		18	48					2	1		14	17	65	80	145	342
Rest of East Texas	2							2								1	1	3	4	7	
North Texas	3						5	8					2			1	3	11	27	38	
West Central Texas		1					3	4								3	3	7	3	10	
West Texas	10						1	11								1	1	12	18	30	
Texas Panhandle	2						2	4										4	7	11	
Gulf Coast, Upper	5							5										5	2	7	
Gulf Coast, Lower	4				1		2	7						1		4	5	12	12	24	
Southwest Texas	2						5	7								3	3	10	7	17	
South Central Texas																1	1	1		1	
West Virginia	5	8					4	17		1	1	2						19	25	44	35
Wyoming	5							5										5	2	7	1
Total United States	181	33		6	2	1	53	276	3	3	2	8	7	2		64	73	357	344	701	956

A-3, ne nw sw 1-7s-8e, Walt 2241-2250 ft, 100 bbls, 2250 ft.

Carter's Price 1, nw se se ne 16-7s-8e, abnd 2994 ft.

ILLINOIS WELL DEEPENED

Wayne County: Texas Co.'s Heaton 3, c e½ nw ne 17-3s-7e, A.V. 3202-14 ft, otd 3400 ft, 70 bbls, 3214 ft.

ILLINOIS WILDCATS

Clinton County—Failure: R. S. Gardenhire's Jantzen 1, nw nw nw 33-2n-2w, abnd 1526 ft.

Gulf's E. Martin 1, sw se se 33-3n-1w, abnd 2953 ft.

Christian County—Failure: Roy Lee, Trs.' Michals 1, se se sw 28-11n-1e, abnd 1722 ft.

Cumberland County—Failure: Falcon Seaboard's McClain 1, c nw sw 12-9n-7e, abnd 2530 ft.

Lawrence County—Failure: E .S. Holmann's Kelly 1, nw se ne 36-4n-12w, abnd 1992 ft.

Marion County — Failure: W. P. Muller's Sloan 1, se se se 2-3n-1e, abnd 2027 ft.

White County—Failure: Sinclair Wyoming's Wilson 1, sw ne se 18-7s-9e, abnd 3243 ft.

INDIANA

Gibson County: Carroll Oil Co.'s Crecelius 3, ne nw se 36-1s-10w, abnd 1420 ft.

Pike County: Indiana Farm Bureau's Steem Comm. 1, se se se 24-1n-7w, Cyp 832-42 ft, 1½ gas, 842 ft.

INDIANA WILDCATS

Gibson County—Failure: Superior of Calif.'s Hull 1, se ne sw 30-1s-11w, abnd 2397 ft.

Continental's C. S. Young 1, se se nw 12-3s-13w, abnd 3316 ft.

Posey County—Failure: Joe Dawson et al's Dearing 1, n½ ne ne 30-8s-14w, abnd 2780 ft.

KANSAS

Barton County—Kraft-Prusa: Armer & Vernon's Hoffman 1, c nw ne 36-16s-12w, Arb 3374 ft, 1500 gal acid, pump 336 bbls, 3390½ ft.

Aylward's South Wendtland 2, c sw ne 4-17s-11w, Arb 3315 ft, 1000 gal acid, pump 50 bbls, 3333 ft.

Black-Marshall's Grosshardt 3, c sw nw 4-17s-11w, Arb 3292 ft, 2000 gal acid, pump 512 bbls, 3327 ft.

Shell's Soeken B-2, ne nw ne 21-17s-11w, sand 3542 ft, Quartzite 3552 ft, 2000 gal acid, salt wtr disposal, 3559 ft.

Cowley County—Eastman: Alco Valve Co.'s Eastman 1, se se sw 7-31s-6e, Arb 3390½ ft, abnd 3405 ft.

Ellis County—Bemis: Champlin's Hadley J-1, c sw se 20-11s-17w, Arb 3471 ft, pay 3502-3 ft, 1000 gal acid, pump 25 bbls, 3505 ft.

Champlin's Hadley L-2, c e½ ne se 30-11s-17w, Arb 3536 ft, perf csg, 1500 gal acid, pump 100 bbls, 3568 ft.

Ellsworth County—Stoltenberg: Cities Service's Kralik B-1, c sw sw 8-16s-10w, Arb 3308 ft, 1500 gal acid, pump 103 bbls, 3322 ft.

Greenwood County—Beaumont: K. T. Wiedemann's Temple 4, sw se nw 25-27s-8e, Miss lime 2423 ft, 2000 gal acid, pump 25 bbls, 2452 ft.

Haskell County—Hugoton: United Prod.'s Hall 18, c, 28-29s-34w, 8000 gal acid, 5,500,000 gas, 2710 ft.

Jefferson County—McLouth: Miller & Smythe's Federal Land Bank 1, ne nw ne 29-9s-20e, Bartles 1443 ft, 10,600,000 gas, 1459 ft.

McPherson County—SE Henne: Westgate-Greenland's Pisel 1, c s½ sw nw 26-17s-1w, Miss chat 2755 ft, 2000 gal acid, 3000 bbls, 2776 ft.

McPherson County—Lindsborg: Carter's Rundbeck 1, c se sw 5-17s-3w, Viola 3336 ft, pb to 3352 ft, 1000 gal acid, 3000 gal acid, pump 108 bbls, 3480 ft.

Carter Carlson 1, c se nw 8-17s-3w, Viola 3415 ft, 2000 gal acid, pump 389 bbls, 3417½ ft.

Pratt County—Iuka: Tuesday Oil Co.'s B. Calbeck 1, c nw ne 1-27s-13w, Arb 4327 ft, 1000 gal acid, abnd 4347 ft.

Reno County—Peace Creek: Stanolind's Peterson 2, se sw nw 2-23s-10w, Viola 3714 ft, 1500 gal acid, pump 115 bbls oil, 29 wtr, 3745 ft.

Auto Ordnance's Hollenbeck 4, sw sw sw 28-23s-10w, Viola 3791 ft, 400 gal acid, swab 2436 bbls, 3800 ft.

Rice County—Chase Area: Aylward Prod.'s Proffitt 1, c nw nw 20-19s-9w, Arb 3242, 1000 gal acid, pump 527 bbls oil 17% wtr 24 hrs, Lans 2918 ft, 1000 gal acid, pump 65 bbls oil, 120 wtr 16 hrs from Lans, 3265 ft.

Harwood's Chas. Seany 1, c nw sw 30-19s-9w, Arb 3260 ft, 2000 gal acid, pump 173 bbls oil, 7 wtr, 3264 ft.

Rice County—Pioneer Area: Aylward Prod.'s Habiger 1, c sw sw 24-19s-10w, Arb 3304 ft, 100 gal acid, pump 50 bbls oil, 250 bbls wtr 4 days, drill deeper, fill 2400 ft wtr, abnd 3336 ft.

Russell County—Fairport: Liggett's Hines A-2, c sw nw 16-11s-15w, Lans 3022 ft, pb to 3375 ft, perf csg, 3000 gal acid, pump 110 bbls oil, 55 wtr, 3393 ft.

Russell County—Witt: Skelly's Boxberger D-1, sw nw se 3-14s-14w, Lans 2977 ft, pb to 3231 ft, perf csg, 4000 gal acid, pump 284 bbls oil, 83 wtr, 3248 ft.

Russell County—Trapp: Great Lakes Carbon's Maag 1, se nw se 7-15s-13w, Arb 3263 ft, 2000 gal acid, swab 20 bbls per hr, 3269 ft.

Phillips' Roesnek 3, c ne se 9-15s-13w, Lans 3041 ft, 7000 gal acid, pump 503 bbls, 3091 ft.

KANSAS WELL DEEPENED

Russell County—Gorham: I. W. Murfin's Sullivan 2, se ne se 2-14s-15w, otd 3095 ft, Arb 3307 ft, pump 21 bbls oil lots wtr, 3321 ft.

KANSAS WILDCATS

Barber County — Failure: Olson Oil Co.'s Axline 1, c ne ne 16-31s-11w, Miss 4505 ft, Kinderhook 4640 ft, Viola 4772 ft, Simp 4852 ft, Arb 4972 ft, abnd 5097 ft.

Barton County—Failure: Falcon-Seaboard et al's Holmes 1, c n½ nw sw 1-20s-14w, Anhy 780 ft, Lans 3229 ft, Arb 3501-93 ft, abnd 3570 ft.

Cowley County—Failure: Ingling & Parker's Eastman 1, se se sw 7-31s-6e, KC 2195 ft, Base KC 2415 ft, Bart zone 2822 ft, Miss 2909 ft, Arb 3390½ ft, abnd 3405 ft.

Deep Rock and Globe's Parsons 1, c sw nw 24-32s-3e, KC 2570 ft, sd and sh 3094 ft, Miss 3164 ft, Base Miss 3448 ft, Simp 3514 ft, Arb 3521-22½ ft, abnd 3522½ ft.

Kiowa County—Failure: Stanolind's Williams 1, c ne ne 9-27s-16w, Lans 4024 ft, soft zone 4120-34 ft, and 4170-80 ft, soft zone 4233-34 ft with sso, Viola 4666 ft, Simp 4743, Arb 4927, abnd 4877 ft.

McPherson County—Failure: Globe's Ericson 1-A, c w½ se sw 35-17s-4w, Miss 2983 ft, Kinderhook 3240 ft, Mise 3458 ft, Viola 3471 ft, Simp 3600 ft, Arb 3663 ft, abnd 3705 ft.

Pratt County—Failure: Helmerich & Payne's Strait 1, ne nw se 36-29s-15w, Lans 3985 ft, Cong 3510 ft, Viola 4543 ft, Simp 4594 ft, Arb 4678 ft, abnd 4751 ft.

Reno County—Failure: Champlin's Jorgenson 1, sw se sw 6-26s-4w, Topeka 2190 ft, Lans 2805 ft, Miss 3571 ft, Kinderhook 3825 ft, Maquoketa 3960 ft, Viola 3999 ft, Simp 4022 ft, Arb, 4110, abnd 4123 ft.

Rice County—Failure: Helmerich & Payne's Staatz 1, sw sw sw 11-18s-9w, Anhy 1140 ft, Topeka 2488 ft, Lans 2880 ft, Cong 3225 ft, abnd 3423 ft.

Rooks County—Failure: Three Way Drlg's Metropolitan 1, nw nw se 17-6s-20w, Anhy 1950 ft, Lans 3495 ft, Base KC 3695 ft, Arb 3765 ft, abnd 3819 ft.

Russell County—New Field: N. Appleman et al's Driscoll 1, ne ne ne 4-15s-14w, Anhy 755 ft, Lans 2957 ft, 154 bbls 8 hrs, gravity 38, td 2991 ft.

Barber County—New Field: Great Lakes Carbon Corp.'s Welsh 1, nw sw se 30-31s-15w, Anhy 890 ft, Topeka 3410 ft, Douglas 4234-49 ft, Lans 4249 ft, Viola 4998 ft, Simp 5182 ft, Arb 5288 ft, pb 4235 ft, pump 85 bbls oil, 25 wtr, 5305 ft.

Barton County—New Field: N. Appleman et al's Stull 1, c s½ se sw 6-16s-12w, Anhy 815 ft, Topeka 2710 ft, Lans 3041 ft, Cong 3296 ft, 5500 gal acid, flow 408 bbls, 3331 ft.

Barton County—New Field: Phillips' Frieb 1, se se sw 33-17s-14w, Topeka 2895 ft, Lans 3200 ft, Congl 3418 ft, Arb 3440 ft, 2000 gal acid, pump 45 bbls, 37.4 gr, 3451 ft.

Cowley County—Failure: D. D. Fowler's Tatum 1, c sw nw 12-31s-6e, Miss 2940 ft, abnd 2962 ft.

B. B. Blair and Summit Drlg. Co.'s Taylor 1, c nw sw 6-34s-5e, Topeka 1175 ft, Douglas 1570 ft, Lans 1867 ft, Layton 2355-2410 ft, KC 2529 ft, Osw 2732 ft, Miss 3109 ft, abnd 3160 ft.

Reno County—Failure: Nadel & Gussman's McRevey 1, ne ne se 33-23s-9w, Lans 3292 ft, Miss 3762 ft, Base Miss 3860 ft, Viola 4060 ft, Simp 4125 ft, Arb 4196 ft, abnd 4225 ft.

Rice County—Failure: Chas. Coats et al's Hill 1, sw sw nw 33-18s-7w, Lans 2795 ft, Sooy 3195 ft, Viola 3338 ft, Arb 3363 ft, abnd 3404 ft.

Rocket Drlg. Co. and Texon's Frevert 1, sw se sw 30-18s-10w, Topeka 2603 ft, Lans 2986 ft, Cong 3282 ft, Arb 3338 ft, abnd 3355 ft.

Stafford County—Failure: Vickers and Atlantic's Koehn-Laudick 1, c sw nw 16-21s-14w, Anhy 860 ft, Lans 3414 ft, Cong 3665 ft, Viola 3683 ft, Simp 3720 ft, Arb 3785 ft, abnd 3836 ft.

KENTUCKY

Henderson County: Sinclair Prairie's Burbank 5, 4-P-21, Cyp 2301-12 ft, 480 bbls, 2312 ft.

Bintliff's Burbank A-2, 24-Q-21, Cyp 2285-2315 ft, 480 bbls, 2315 ft.

Farm Bureau's Burbank 3, 24-Q-21, Cyp 2287-2303 ft, 500 bbls, 2303 ft.

Union County: Frontier Fuel's Fenwick Bros. 1, 6-O-20. abnd 2652 ft.

Ohio's French 1, 10-O-19, abnd 2710 ft.

KENTUCKY WILDCAT

Crittenden County—Failure: H. C. Detrick's Lynn Orr 1, 24-K-19, abnd 1130 ft.

SOUTH LOUISIANA

Beauregard Parish—Neale: Atlantic's Rice Land & Lumber 3-E, nec 33-3s-11w, 5½-in 11,600 ft, perf 10,974-11,004 ft, 212 bbls, 10/64-in, td 11,602 ft.

Evangeline Parish — Ville Platte: Continental's Hirsch 10, fr w cor sec 43, go se alg swl 4935 ft, th 399 ft ne at ra in sec 43-3s-2e, 6-in 10,315 ft, perf 10,238-48 ft, 312 bbls, 3/16-in, td 10,315 ft.

LaFourche Parish — Raceland: Amerada's Moore 5, bgin nw cor sec 34, go s 50 deg 35 mins 2 5279 ft, th n 81 deg 22 mins e 3371 ft, th s 8 deg 34 mins e 1012 ft to lcn in 34-15s-19e, 5½-in 9295 ft, perf 8910-22 ft, flow 226 bbls, ⅛-in, td 9350 ft.

Plaquemines Parish—Delacroix: Texas Co.'s Unit 1, s 25 deg 40 mins w 11,630 ft from USCGS station "Long" in state waters sec 3-16s-24e, set 7-in 10,257 ft, perf 8968-76 ft, 86 bbls 3/16-in chk, td 10,375 ft.

Plaquemines Parish—Garden Island: Texas Co.'s State-Garden Island 59, go so 49 deg 23 mins w 8106 ft fr Mon "Minnesota" in 108-22s-32e, 7-in 5563 ft, perf 5364-5430 ft, 146 bbls, ⅛-in chk, td 6896 ft.

Plaquemines Parish—Venice: Tide Water's Buras Levee 20, 115 ft n & 260 ft w of se c 28-21s-30e, 5½-in 11,093 ft, perf 10,975-11,035 ft, 357 bbls 5/32-in, td 11,402 ft.

St. Mary Parish—West Cote Blanche Bay: N 39 deg 12 mins e 25,155 ft frm USCGS monument "Ned," in bay, T-15s-7e, 7-in 9152 ft, perf 8440-65 ft, 145 bbls ⅛-in, td 9392 ft.

SOUTH LOUISIANA WILDCAT

St. Landry Parish—Discovery: Gulf's Haas-Hirsch 1, Krotz Springs area, 3008 ft s, 1883 e nw c 21-6s-7e, 7-in 10,027 ft, perf 9316-26 ft, 358 bbls, 5/16-in, td 11,398 ft.

NORTH LOUISIANA

Bienville Parish—Bear Creek: H. L. Hunt Oil Co. et al's Hodge-Hunt Southern Advance A-1, c se nw 11-16n-6w, 11,500,000 ft gas, open flow, no gauge of distillate, td 7248 ft.

Bossier Parish—Sligo: Triangle Drlg. Co.'s Kerr B-2, 24-17s-12w, pump 49 bbls.

MICHIGAN

Mecosta County—Fork: Sun's Murray 3, s½ se sw 5-16n-7w, flow 53 bbls, Dundee lime, 3814 ft.

Ottawa County—Grand Rapids: C. J. Farley's Rankin 1, ne se se 15-7n-13w, swab 12 bbls, Traverse lime, td 1885 ft.

Van Buren County—Bangor: A. S. Hoyt's Minshall 1, se sw nw 21-2s-16w, abnd, Traverse lime, 1006 ft.

MICHIGAN WILDCAT

Jackson County—Failure: Ohio Oil Co.'s Taylor 1, c ne ne 8-2s-1w, Traverse 1846 ft, abnd 1935 ft.

NEW MEXICO

Eddy County: Aston & Fair's Arnold 1-I, c se nw 26-17s-30e, flow 25 bbls, 2-in, shot 520 qts 3192-3292 ft, td 3300 ft.

Lea County—East Lusk: Culbertson & Irwin et al's Lynch-Texaco 3, c se sw 21-19s-32e, pump 185 bbls oil, 62 bbls water, lime 2772-76 ft.

Lea County—Maljamar: Johnny Cockburn et al's Miller 7-B, c ne ne 25-17s-32e, flow 240 bbls, 2-in, shot 220 qts, 4050-4230 ft.

You may have surplus equipment that is urgently needed by some other operator. See the

★

TRADING POST SECTION

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NEW YORK

Allegany County: Bradley Prod. Corp.'s Sprague farm, Alma, 6 bbls, Richburg, 1330 ft.
W. J. McKee et al's McKee farm, Bolivar, 5 bbls, Richburg, 1454 ft.
R. B. Moore et al's Moran farm, Bolivar, 7 bbls, Richburg, 1270 ft.
Cretekos & Vossler's Norton farm, Scio, 6 bbls, Richburg, 1059 ft.
Curt Oil Co.'s Williams farm, Alma, 5 bbls, Richburg, 1339 ft.
Custer Oil Co.'s Norton farm, Scio, 6 bbls, Richburg, 1366 ft.
Pat Oil Co.'s Shaughnessy farm, Alma, 6 bbls, Fords Brook, 1318 ft.
Scio Oil & Gas Co.'s Clark farm, Scio, 7 bbls, 773 ft.
C. S. Christman & Son's Cass farm, Wirt, 8 bbls, Richburg, 1388 ft.
J. & W. Oil Co.'s Peterson farm, Wirt, 6 bbls, Richburg, 1436 ft.
Scott & Sackinger's Scott farm, Bolivar, 9 bbls, Waugh-Porter, 1460 ft.

Intake Wells

Allegany County: Bradley Prod. Corp.'s Sprague farm, Alma, Richburg, 1324 ft.
Andrews Bros. Oil Co.'s Minnum farm, Alma, Richburg, 1534 ft.
L. H. Thornton et al's Smith farm, Willing, Fords Brook, 1266 ft.
H. H. Patterson et al's Black farm, Scio, Scio, 910 ft.
Bliven Hill Oil Co.'s Smith farm, Amity, Scio, 849 ft.
Messer Oil Co.'s Koehler farm, Clarksville, Richburg, 1438 ft.

OHIO

Athens County: Bode et al's Pres Frost 1, abnd, 1035 ft.
Gross & McCune's Antle 8, 10 bbls, 474 ft.
Milhoon's Bryson 14, abnd, 393 ft.
Cuyahoga County: East Ohio Gas Co.'s Oreng and May 1, abnd 2563 ft.
Hocking County: M. H. Porter's Hocking & Athens Coal Co. 1, 400,000 gas, 997 ft.
Jefferson County: J. E. M. Oil Co.'s Iddings 1, 1½ bbls, 710 ft.
Medina County: Wiser Oil Co.'s Eastwood 1, 5,000,000 gas, 3491 ft.
Ohio Fuel's McKee 1, 1,970,000 gas, 3293 ft.
Ohio Fuel's Bennezek 1, 914,000 gas, 3139 ft.
Ohio Fuel's Evans 1, abnd 2723 ft.
Meigs County: Ohio Fuel's Hart 1, 262,000 gas, 843 ft.
H. M. Nelson's Jas. Woodard 2, 90,000 gas, 729 ft.
Downie et al's Ward 3, 215,000 gas, 706 ft.
Morgan County: D. T. Orndoft's Glass 2, 67,000 gas.
Ohio Fuel's Weaver 1, 157,000 gas, 1169 ft.
Pure's Stoneburner 1, 100,000 gas, 1228 ft.
Perry County: Ohio Fuel's Coulter 2, abnd 4238 ft.
Pure's Cannon 5, 125 bbls, 3195 ft.
Hermey Bros.' Hermey 27, 10 bbls, 1095 ft.
Tuscarawas County: J. A. Upham's Murphy 1, 898,000 gas, 5313 ft.
Columbia Carbon's Norris 1, 184,000 gas, 5028 ft.
Washington County: Ohio Fuel's Goff 1, abnd 1902 ft.
Wayne County: Ohio Fuel's Austin 1, 648,000 gas, 2921 ft.

OKLAHOMA

Caddo County—Cement: Ohio Wagner Acct 1-11, ne ne sw 12-5n-9w, Wade 3989-4099 ft, gas 4058 ft, oil 4024 ft, pump 90 bbls oil, 30 wtr, 4141 ft.
Carter County—Tussey: Allied Materials' Epley 1, ne nw nw 9-1s-3w, sand 2389-2404 ft, flow 17 bbls oil, 1,500,000 gas, 2993 ft.
Creek County — Hickory Grove: Malernee's Adams 1, se ne nw 2-14n-7e, abnd 63 ft.
Creek County—Glenn: Gulf's Berryhill 32, se se sw 9-17n-12e, Glen 1375 ft, 1545 ft.
Sinclair-Prairie's Berryhill 44, c sw ne 16-17n-12e, Glen 1406 ft, pay 1472-1590 ft, pump 10 bbls, 1771 ft.
Garfield County—Garber: Sinclair-Prairie's Crews 24, c½ se 19-22n-3w, sand 2012-16 ft, pb to 2040 ft, pump 1 bbl, 2198 ft.
Jefferson County—Spring: Seitz-Comegys-Seitz' Barrett 3B, se sw se 14-6s-6w, sand 1849 ft, abnd 1851 ft.
Noble County—Liberty: Deep Rock's R. Schultz 3-A, c ne sw 9-22n-2e, Wx 4535-41 ft, abnd 4541 ft.
Okmulgee County—Tiger Flats: Lewis et al's Grayson 1A, c ne sw 14-12n-12e, 2nd Dutcher 2242-46 ft, 500,000 gas, 2246 ft.
Okmulgee County—Bald Hill: D. W. Howard's Trumbo 4A, nw se ne 18-14n-15e, abnd 1300 ft.
Pawnee County—Yale-Quay: Lake Oil Co.'s Sallee 1A, ne sw se 32-20n-6e, Wx 3413 ft, abnd 3447 ft.
Pawnee County—East Watchorn: Wentz' Fee 1, c se se 23-23n-3e, Wx 3855 ft, flow 118 bbls, 3883 ft.
Payne County—Villa: Oklahoma Gas Plants Inc.'s Minnich 3, c ne ne 3-18n-6e, 2nd Wx 3436 ft, abnd 3465 ft.
Seminole County—Misson: E. Kubat's S. S. Orwig 1A, nw sw nw 1-8n-5e, Hunton 3978 ft, Viola 4105 ft, pb 4127 ft, 8,000 gal acid, pump 100 bbls, 4243 ft.
Seminole County—Wewoka: Jordan Orr 1, nw nw sw 16-8n-8e, Wx 4258 ft, perf in Hunton, 25 bbls oil, 75 wtr, abnd 4271 ft.
Jordan's Tenill 2, c n½ se ne 17-8n-8e, Hunton 3948 ft, flow 152 bbls, 4266 ft.
Seminole County—Seminole City: Oklahoma Oil Corp.'s Tiger 1, c nw ne 13-9n-6e, Hunton 3952 ft, 2000 gal acid, flow 224 bbls, 2,500,000 gas, 3983 ft.
Stephens County—Velma: Skelly's Selby 39, nw se se 26-1s-5w, sand 782-97 ft, 797-808 ft, pb to 808 ft, shot 20 qts, pump 5 bbls oil, 2 wtr 8 hrs, 845 ft.
Skelly's Selby 40, ne se se 26-1s-5w, sand 804-27 ft, shot 15 qts 817-27 ft, pump 18 bbls, 858 ft.

OKLAHOMA WELL DEEPENED

Okfuskee County—Olimpic: Sinclair-Prairie's Fisher 6, sw nw sw 19-10n-9e, otd 1869 ft, Senora 1842 ft, pay 1871-86 ft, shot 30 qts, pump 2½ bbls, 1892 ft.

OKLAHOMA WILDCATS

Haskell County—Failure: J. C. Mulhall's Billington 1, nw nw nw 31-9n-19e, abnd 1803 ft.
Hughes County — Failure: S. W. Collins' Jenkins 1, se nw sw 14-7n-9e, temp abnd.
Otha Grimes Sevier 1, se se se 8-8n-11e, Booch 2377-2410 ft, abnd 2413 ft.
Phillips' Jesse 1, ne se nw 21-8n-11e, Senora 520 ft, brown lime 2223 ft, Booch zone 2367 ft, Atoka 2640 ft, Glc 2847 ft, Wapanucka 3410 ft, Union Valley 3639 ft, Cromwell 3678 ft, abnd 3733 ft.
Lincoln County—Failure: Wilcox O&G Co.'s Battle 1, se se ne 30-14n-5e, Belle City 2210 ft, Hogs 2535 ft, Layton 2645 ft, Ccb 2883 ft, Cleve 2901 ft, Miss 4353 ft, Viola 4798 ft, Wx 4875 ft, abnd 4929 ft.
Lincoln County—New Gas Field: Morgan & Flynn et al's Bonebrake 1, nw nw ne 32-17n-5e, Avant 2000 ft, Hogs 2295 ft, Ccb 2595 ft, Osw 3135 ft, Miss 3780 ft, Viola 4025 ft, 1st Wx 4080-88 ft, perf 3431-49 ft, 26,257,000 gas, 4088 ft.
Okfuskee County—Failure: Richard Hughes' Gregg 1, sw ne sw 18-11n-8e, Cromwell 3626 ft, abnd 3633 ft.
Pawnee County—Failure: Lake Oil Co.'s Sallee 1-A, ne sw se 32-20n-6e, Pawnee lime 2370 ft, Osw 2740-80 ft, Prue 2810 ft, abnd 3447 ft.
Pottawatomie County—Failure: Paul Traugh's School Land 1, sw se nw 16-6n-5e,

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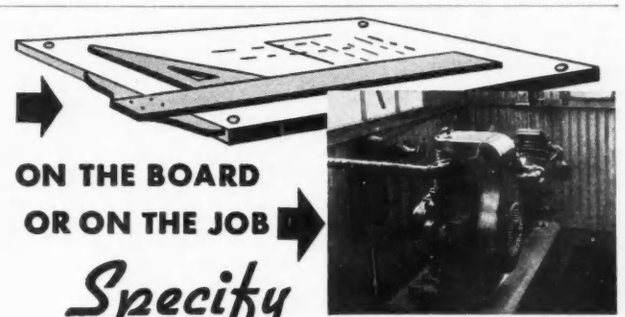

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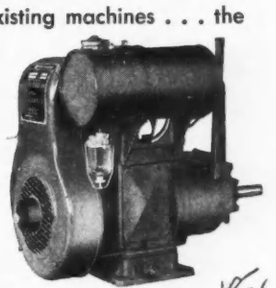

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Hogs 1280 ft, U. Layton 1300 ft, Denay 1325 ft, L. Layton 1390 ft, Ccb 1765 ft, Cleve 1720 ft, Wet 2360 ft, Calvin 2440 ft, abnd 3212 ft.

Seminole County—Failure: Lake Oil Co.'s Fleet 1, nw ne sw 7-5n-7e, Calvin 1220 ft, Senora 1540 ft, Wapa 2239 ft, 2nd Wx 3900 ft, abnd 3902 ft.

Stephens County—Failure: W. J. Price et al's Miller 1, c se nw nw 20-2s-8w, abnd 1130 ft.

Garvin County—Failure: H. L. Hurst's Parish 1, c se ne ne 11-3n-1w, Penn 3985 ft, sandy shale 4022-26 ft, abnd 4261 ft.

Bradley Bros.' Strickland B-1, nw ne sw 10-4n-3e, shale 2715 ft, abnd 2715 ft.

Jackson County — Failure: Loyd Noble's Mayrhofen 1, c ne sw 32-2n-23w, Wichita Albany 1795 ft, Pontotoc 2610 ft, Cisco 2930 ft, Canyon 4720 ft, Bend 6230 ft, abnd 7503 ft.

Kiowa County—Failures: E. M. Thompson's Baker 3, c n½ nw 7-6n-18w, granite wash 1015-17 ft and 1140-56 ft, abnd 1199 ft.

J. Benn Russell's Houston 1, nw sw sw 26-7n-14w, Pontotoc 700 ft, Viola 1178 ft, abnd 1191 ft.

Lincoln County—Failure: Fain-Porter and Continental's Rodgers 1, sw se sw 21-15n-6e, Hogs 1698 ft, Ccb 2313 ft, Clev 2371-2420 ft, Osw 3126 ft, Prue 3145 ft, Miss 3858 ft, Wood 4110 ft, Viola 4240 ft, 1st Wx 4287-94 ft, 2nd Wx 4340 ft, abnd 4340 ft.

Pawnee County—Failure: Aladdin's King 1, c nw sw 2-23n-5e, Osw 2620 ft, Miss 3124 ft, abnd 3635 ft.

Payne County — Failure: Blackwell O&G Co.'s Goldsby 1, sw sw ne 2-17n-4e, Osw 3355 ft, Prue 3410-45 ft, Bart 3615 ft, Miss 3880 ft, abnd 3880 ft.

OLD WELL DEEPENED

Jackson County — Failure: Burnham Oil Co.'s Hall 1, c nw nw 20-1n-20w, abnd 4286 ft.

PENNSYLVANIA

Fayette County: Peoples' Sasja 1, 40,000 gas, 3815 ft.

Greene County: Mfgrs. Lt. & Heat Co.'s Sayers 1, 285,000 gas, 3454 ft.

Waynesburg Home Gas Co.'s Tharp 1, 134,000 gas, 2797 ft.

A. V. Lewis et al's Lemmons 1, 70,000 gas, 3754 ft.

Drilled Deeper

Clarion County: Owens-Illinois Glass Co.'s Blotzer 1, 19,000 gas, 3204 ft.

Greene County: Brummage & Brummage's Hathaway 2, 189,000 gas, 2925 ft.

WEST VIRGINIA

Calhoun County: South Penn Nat. Gas Co.'s Brannon 9, abnd 2175 ft.

South Penn Nat. Gas Co.'s Rothisberger 8, 1 bbl, 1996 ft.

Connolley & Weaver's Elliott 2, 6 bbls, 2064 ft.

Clay County: Clay Gas Co.'s Corp 8, 3,653,000 gas, 1718 ft.

Pitts. & W. Va. Gas Co.'s Fee 7, 891, abnd 1967 ft.

Gilmer County: Mud Lick Oil & Gas Co.'s Means 1, abnd 2071 ft.

Carnegie's Whiting 1574, 81,000 gas, 1532 ft.

Jackson County: United Fuel Gas Co.'s Mays 5110, 4,093,000 gas, 5295 ft.

Godfrey L. Cabot's Winters 1044, 103,000 gas, 5275 ft.

United Fuel Gas Co.'s Fisher 5131, 12 bbls, 5122 ft.

Kanawha County: South Penn Nat. Gas Co.'s Wines 4, 3 bbl, 1200 ft.

Columbian Carbon Co.'s Jones 13, 36 bbls, 1740 ft.

Buff Lick Oil & Gas Co.'s Young 1, 347,000 gas, 2037 ft.

Ritchie County: South Side Gas Co.'s Powell 3, 30,000 gas, 1710 ft.

Pittsburgh & W. Va. Gas Co.'s Barnard 2, 30,000 gas, 2015 ft.

Upshur County: Earl Goodwin's Brown and Bean 1, abnd 2100 ft.

Pittsburgh & W. Va. Gas Co.'s Higginbotham 7904, 137,000 gas, 4505 ft.

Drilled Deeper

Gilmer County: Pittsburgh & West Virginia Gas Co.'s Upton 7528, abnd 2081 ft. Deepened from 1645 to 2081 ft.

Putnam County: Summit Gas & Development Co.'s Riddle 1, 112,000 gas, 2028 ft.

LOWER TEXAS COAST

Goliad County—Sarco Creek: Ginther, Warren & Ginther's Wood 2, s 40-ac of 80-ac lot 7 of Swiger subdvn of n 3199-ac tr, Carrie Wood Ranch, Pedro Villa gr, abnd 5518 ft.

Jackson County—Stewart: Texas Co.'s Mauritz 1-C, 660 ft fr w'ly wl & 660 ft fr w'ly sl of 286-ac tr, George Sutherland sur, 5½-in 5785 ft, abnd 6168 ft.

Jim Wells County—Seeligson: Humble's King Ranch-Cabeza 9, 660 ft fr n&wl's W. L. Dickson sur 52, 5½-in, 6080 ft, sand 6070 ft, flowed 132 bbls, 1/8-in, td 6080 ft.

Magnolia's Seeligson 37, 12,980 ft fr el & 3300 ft fr sl Los Jaboncillos gr, sand 5224 ft, 7-in 6059 ft, perf 5961-64 ft, 162 bbls, 7/64-in, td 6050 ft.

Texas Co.'s Tijerina 1, 660 ft fr nl & 1980 ft fr wl AB&M 359, A-20, 5½-in 6180 ft, sand 5646 ft, perf 5646-51 ft, 22 bbls, ¼-in, td 6300 ft.

Nueces County — Agua Dulce: Chicago Corp.'s Schubert 2, sw 193, 7-in 7079 ft, perf 7035-40, 7035-39, and 7052-65 ft, gas input well, td 7079 ft.

San Patricio County — Midway: Midway-Victory Oil Co.'s Floerke 1, 467 ft fr wl & 467 ft fr nel sec 83, sand 5345 ft, 5½-in 5415 ft, perf 5345-50 ft, 80 bbls, 3/16-in, td 5415 ft.

LOWER TEXAS COAST WILDCATS

Jackson County—Failure: Humble's San Antonio Joint Stock Land Bank 1, 489-ac tr, Carlos Lasso sur, A-40, abnd 6867 ft.

Nueces County — Failure: R. H. Hawn's Bauer 1, 77-ac lse, Nueces River Irrigation Park Subdvn, Mariano Lopez de Herrerra gr, abnd 6010 ft.

Refugio County—Failure: Bridwell Oil Co.'s Glover 1, 660 ft fr nw & nel's 369-ac lse, John Sinnott sur, A-68, abnd 3808 ft.

Refugio County—Failure: Gulf's Tatton 2, 2320 ft fr nl & 3170 ft fr wl 3229-ac tr, Essey Reed sur, A-251, 7-in 8543 ft, abnd 8680 ft.

Refugio County—Discovery: P. R. Rutherford's Fagan 1-F, 1400 ft fr s&wl's 1400-ac lse, 1 mi se Fagan field, 5½-in 3094 ft, perf 2756-63 ft, flow 3,500,000 gas, 3/8-in, td 6515 ft.

SOUTHWEST TEXAS

Duval County—Sejita: Standard of Texas and Trinity Gas Corpn.'s Canay 1, 800 ft fr wl & 650 ft fr nl 60-ac lse, tract 28, San Pedro de Charco Redondo gr, abnd 7203 ft.

Standard of Texas and Trinity Gas Corpn.'s Smith 1, 660 ft fr n&el's lot 5, blk 28, abnd 6021 ft.

Jim Hogg County—Colorado: Humble's East 7, lots 75 & 76, Las Moretas gr, 1091-ac tr, 5½-in 3078 ft, sand 3085 ft, flow 63 bbls, ¼-in, td 3095 ft.

Starr County—Boyle: D. C. Bintliff's Garcia 1, 330 ft fr s&wl's of e½ 80-ac lse, porcion 91-92, abnd 4080 ft.

Starr County—Rincon: Continental's Slick 77-A, 330 ft fr wl & 988 ft fr sl CCSD&RGNG 529, 5666-ac lse, abnd 4246 ft.

Continental's Slick 5-E, 330 ft fr wl & 1653 ft fr nl CCSD&RGNG 537, 6-in 3941 ft, perf 3895-3905 ft, 221 bbls, 3/16-in, td 4150 ft.

Humble's San Antonio Loan & Trust 5, 1980 ft fr n&el's CCSD&RGNG 504, abnd 5214 ft.

SOUTHWEST TEXAS WILDCATS

McMullen County—Failure: Hickok & Reynolds' Shiner Rch 1, 900 ft fr wl & 1100 ft fr nl sec 40, 620-ac lse, abnd 1860 ft.

Starr County—Failure: Magnolia's Hinojosa Est 3, 3300 ft fr s'ly nl of 4579-ac tr, S. de la Garza Porcion 110, abnd 2444 ft.

Starr County—Failure: T. E. Stephens' Gonzales 1, 400 ft fr nl & 784 ft fr el share 232, porcion 69, 5½-in 4617 ft, temp abnd 5379 ft.

SOUTH CENTRAL TEXAS WILDCAT

Travis County—Failure: E. R. Marts' Nelson & Bros 1, 121-ac lse, Peter C. Harrison sur, Elroy area, abnd 961 ft.

TEXAS GULF COAST

Harris County — Satsuma: Amerada and Stanolind's Carpenter 2, 466 ft fr s, 1519 fr wl 235-ac tr, Francis Fry sur, 7-in 6829 ft, perf 7270-75 ft, 189 bbls, ⅛-in, td 7278 ft.

Liberty County—Esperson: General Crude's Esperson-Moore Bluff 1-B, 142-ac tr, 660 ft fr s&el of lse, sur 1149, 5½-in 8598 ft, perf 8460-8525 ft, 181 bbls, ⅛-in, td 8892 ft.

Matagorda County—North Bay City: Ohio Oil Co.'s McDonald 2, 600 ft fr w'ly line of 700-ac tr, Jacob Betts Lge, A-7, 5½-in 8797 ft, perf 7877-80 ft, 242 bbls, ⅛-in, td 8819 ft.

San Jacinto County—Mercy: Shell's Dunnam

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P. O. Box 2608 Houston, Texas

3, 550 ft fr el, 750 ft fr sl J. R. Richardson sur, 673-ac tr, sand 8269 ft, 5½-in 8256 ft, 174 bbls, ⅛-in, td 8295 ft.

Wharton County—Boling: Mackhank Petroleum Co.'s Texas Gulf Sulphur 1, 25-ac unit, James Scott sur, sand 4320 ft, 7-in and 5½-in 4309 ft, flow 298 bbls, 15/64 in, td 4339 ft.

EAST TEXAS

Wood County—Coke: Amerada's Kennemer 2, 1457 ft from s and 467 ft from w lines 98.15-ac lse, B. Smith sur, elev 511 ft, top Paluxy series 6272 ft, swab 132 bbls, perf 6333-56 ft, td 6361 ft.

Amerada's McCreight 2, 1440 ft from s and 467 ft from e lines lse, M. Y'Barbo sur, elev 482 ft, flow 256 bbls, ½-in, perf 6314-31 ft, td 6332 ft.

EAST TEXAS WILDCAT

Hunt County—Failure: R. T. Myers et al's England 1, 330 ft from n and 1350 ft from e lines Willard Marler sur, elev 533 ft, Austin 2810-2975 ft, Woodbine 3698 ft, Georgetown 4550 ft, abnd 5008 ft.

NORTH TEXAS

Cooke County: Camball Oil Co.'s Campbell 2-A, O. F. Leverett Sur, Ellenburger 1385 ft, abnd 1482 ft.

Throckmorton County: A. R. Mathews et al's Brockman 2, 1050 ft out SWc blk 94, Comanche Indian Res, pump 7 bbls, sand 711-17 ft.

Robt. E. Sweeney et al's Herron 1, 330 ft out NEc nw TE&L 1607, abnd 743 ft.

Wichita County—K-M-A: W. H. Hammon et al's Fee 18, 1389 ft from e and 6900 ft from n lines E T Ry sec 2, flow 427 bbls ½-in, shot 90 qts 3987-4018 ft.

Wichita County: C. Y. Gorman et al's Doyle 4, 330 ft from n and 990 ft from w lines blk 1, Geo Wheelwright sur, A-320, abnd 1214 ft.

Wilbarger County: Phillips' Waggoner Est. 212, 1230 ft from w and 660 ft from s lines se H&TC 46, blk 4, abnd 1945 ft.

Young County—Padgitt: Shell's Foster 1-A, 1388 ft from s and 467 ft from e lines TE&L 337, Bend 4210 ft, Miss. 4711 ft, Ellenburger 4958 ft, abnd 4986 ft.

Young County: Graham Royalty Co.'s Gragg 31, 600 ft n and 300 ft e of NWc S. G. Maupin sur, but in A. Rohus sur, pump 10 bbls, sand 714-29 ft.

Phillips' Johnson-Pan 20-A, 528 ft from w and 150 ft from s lines lot 14, E. W. Sergeant sur, pump 6 bbls, sand 568-82 ft, td 585 ft.

NORTH TEXAS WILDCATS

Archer County—Failure: Avis B. Taylor et al's Hemmering 1, 330 ft out SWc BBB&C 1, A-37, abnd 1301 ft.

Clay County—Watson Pool New Pay: Whitaker Oil Co.'s Gragg 1, 933 ft from n and 467 ft from w lines TE&L 2672 ft, pump 115 bbls, shot 24 qts 3664-75 ft, Strawn, td 3690 ft.

Jack County—Discovery: Hanlon & Buchanan's Ellis-DuBose 1, 2758 ft from s and 4121 ft from w lines lot 6, J. W. Williams sur, A-877, 1¾ mi sw slightly deeper production in Hoefle pool, flow 452 bbls, ¼-in, acid 3000 gals Bend 4785-4827 ft, td 4828 ft in shale.

TEXAS PANHANDLE

Hutchinson County: Phillips' Ebling-McDowell 2, AB&M 18, blk M-16, junked 3252 ft.

Rogan Oil Co.'s Kay 4, T. C. Ry. sec 27, blk M-23, pump 43 bbls, acid 1,000 gals 3164-3212 ft.

Shamrock O&G Co.'s Stewart 3, AB&M 19, blk M-16, pump 288 bbls, shot 85 qts, 3148-74 ft.

Wheeler County: Phillips' Wood 1, sw sw ne H&GN 95, blk 17, elev 2319 ft, granite 2150 ft, abnd 2155 ft.

WEST CENTRAL TEXAS

Coleman County: Lone Star Gas Co.'s Duggins 1, 940 ft from n and 1141 ft from w lines 484-ac tr, M. A. Fisk sur 630, elev 1585 ft, Bend 1640 ft, Marble Falls 2134 ft, 45,000,000 gas, acid 4000 gals, 2134-96 ft.

Jones County: Phillips' Carlson-Pan 1, 654 ft from s and 331 ft from w lines nw H&TC 19, blk 3, elev 1506 ft, abnd 3300 ft.

Shackelford County: Roeser-Pendleton-Conoco's Nail 3-A-146, 330 ft from s and 751 ft from w lines n½ ET 146, elev 1762 ft, abnd 1623 ft.

Taylor County — Merkel: Fain - McGaha's Perry 2-B, 990 ft from s and 1320 ft from e lines subdiv 4, Grimes CSL, leag 124, elev 1788 ft, abnd 2640 ft.

WEST CENTRAL TEXAS WILDCATS

Callahan County—Failure: Bennett & Little's Johnson 1, 1295 ft from w and 3930 ft from n lines B. O. A. Sur, abnd 325 ft.

Coleman County—Failure: T. S. Stanfield et al's Verches 1, 1200 ft from n and 900 ft from e lines blk 4, L. C. Manson sur No. 80, abnd 805 ft.

Taylor County—Failure: Condor Pet. Co.'s Warren 1, 2530 ft from n and 2200 ft from e lines blk 123, J. W. Page sur No. 113, elev 1774 ft, abnd 2720 ft.

WEST TEXAS

Andrews County—Emma: Sinclair Prairie's Cowden 20, 1569 ft from n and 1624 ft from e lines T&P 12, blk 44, T-2-N, flow 813 bbls, 2-in, acid 5500 gals, 4191-4291 ft.

Andrews County—Fullerton: T. P. Coal & Oil Co.'s Jackson 1, c nw nw PSL 17, blk A-32, elev 3342 ft, flow 1790 bbls, 2-in, acid 24,000 gals Clear Fork 6775-7245 ft.

Andrews County—West Andrews: Phillips' University-Andrews 19, c ne sw sec 13, blk 11, elev 3298 ft, top Hobbs lime 4255 ft, abnd 4404 ft.

Crockett County—Soma-Noelke: T. P. Coal & Oil Co.'s Fee-Wilton 2, 1283 ft from n and 826 ft from w lines sec 27, blk GC, M. T. Wilson sur, flow 208 bbls 2-in, natural, 1562-84 ft.

Hockley County—Slaughter: Jerry Hawkins et al's Mallet 17-A, 580 ft out NWc lab 22, leag 47, Edwards CSL, flow 927 bbls cas, acid 11,500 gals 4953-95 ft.

Howard County: Ray Oil Co.'s Foster 2, se sw sw T&P 42, blk 29, T-1-N, flow 220 bbls cas, shot 420 qts 2635-2725 ft.

Pecos County—Abell: Tal-Vez Oil Co.'s Silverman-State 2, 990 ft from sw and 2310 ft from nw lines H&TC 10, blk 3, flow 150 bbls, plus 1½ percent bs&w, 15/64-in, McKee sand perf 5470-75 ft, td 5963 ft.

Ward County—Spencer: Texas Co.'s Spencer 1, c e¼ s¼ H&TC 53, blk 34, elev 2625 ft, flow 144 bbls 2-in, acid 1500 gas, 2918-28 ft.

Winkler County—Eaves: Harry Adams-Bradley's Edwards-Shell 7, 660 ft from s and 570 ft from e lines PSL 6, blk C-23, flow 160 bbls, plus 71 bbls water, 2-in, natural, 3159-88 ft.

Winkler County—Keystone: Ralph Lowe et al's Campbell 1-C, c nw se PSL 28, blk B-3, flow 132 bbls, 3/8-in, shot 100 qts 3280-3319 ft.

Yoakum County—Wasson: Drilling & Exploration Co.'s Hudson-Shell 10-C, c ne nw sec 834, flow 77 bbls, 5/16-in, acid 9000 gals 4930-5115 ft.

Plymouth Oil Co.'s Bennett 1-F, se se sw sec 614, flow 541 bbls 2-in, acid 9000 gals 5200-65 ft.

WEST TEXAS WILDCAT

Schleicher County — Failure: Geo. Livermore-E. M. Wahlenmaier's Thomson 1, 660 ft from s and 3400 ft from e lines TC 75, blk TT, elev 2207 ft, Strawn 5920 ft, detrital 6560 ft, Ellenburger 6610 ft, abnd 7009 ft.

WYOMING

Natrona County—Cole Creek: General Petoleum Corp.'s 33-21-G (Gov't) nw se nw 21-35n-77w, pump 90 bbls, Shannon 4506 ft, td 4544 ft.

Park County — Oregon Basin: Yale Petroleum Co.'s Hancock 1, nw nw nw 5-50n-100w, pump 240 bbls, elev 5546 ft, Embar 3311 ft, td 3364 ft.

Yale's Hancock 2, nw ne nw 5-50n-100w, flow 192 bbls, 5/16-in, elev 5507 ft, Embar 3217 ft, td 3252 ft.

Sweetwater County — Lost Soldier: Sinclair Wyoming's U. S. Petroleum 10, nw nw se 11-26n-90w, flow 500 bbls, Tensleep 5262 ft, td 6475 ft.

Sweetwater County—Wertz: Sinclair Wyoming's Unit 28-A, ne sw se 1-26n-90w, flow 600 bbls, elev 7101 ft, Tensleep 6130 ft, td 6495 ft.

United States Wildcat Starts

ARKANSAS

Miller County: Barnsdall's Grace 1, c se nw 4-15s-27w, lcn.

CALIFORNIA

Fresno County: Tide Water Associated's 11-A, 3-21-15, lcn, Coalinga area.

Kern County: Texas Co.'s Bowerbank 1-6-C, 6-29-24, lcn, Bowerbank area.

Tide Water Associated's KCL 32-17, 17-30-26, lcn.

Orange County: Texas Co.'s Buena Park Unit 5-J1, 31-3-10, lcn, Buena Park area.

ILLINOIS

Clinton County: Smokey Oil Co.'s Friedrich 1, se sw se 7-1s-5w, lcn.

Effingham County: H. H. Weinert's Berry 1, nw ne sw 34-8n-5e, lcn.

Jefferson County: Roy Lee, Tr.'s Stirwalt 1, ne nw ne 12-1s-3e, lcn.

Perry County: Stanolind's J. H. Jackson 1, nw nw se 2-5s-1w, lcn.

Richland County: Sun's Rennier 1, ne se ne 16-4n-14w, lcn.

Shelby County: P. W. Stephens et al's Stephens-Fee 1, c se ne ne 11-9n-13, lcn.

Roy Lee, Tr.'s Stevens 1, c se se sw 2-10n-4e, dr.

Williamson County: Superior's Rogers-Harris 1, ne sw nw 24-8s-3e, lcn.

INDIANA

Porter County: Tri-State Syndicate's Anderson 1, ne nw se 3-36n-5w, lcn.

KANSAS

Ellis County: Phil-Han Oil Co.'s Kindernecht 1, ne ne ne 8-14s-19w, mim.

McPherson County: Phil-Han Oil's Aide 1, c s½ se se 8-17s-1w, lcn.

Pawnee County: Stanolind's Holman 1, ne ne se 22-20s-19w, rur.

Phillips County: Tom Allan and Co-Operative's Skelton 1, c ne nw 18-2s-19w, lcn.

Reno County: Fred Kock & C. L. Carlock's Russell 1, se se nw 33-22s-10w, cellar.

Falcon Seaboard's McCalla 1, c ne ne 23-25s-10w, mim.

Rooks County: Cities Service's Gregory 1, nw ne nw 3-8s-16w, lcn.

Russell County: Dickey's Eulert 1, sw sw nw 26-11s-15w, Anhy 945 ft, dr 1215 ft.

Ted Spencer's Krug 1-A, ne ne sw 8-14s-14w, sp.

KENTUCKY

Henderson County: Carter's Denton 1, 21-O-23, lcn.

Farm Bureau and P. Rossi's Boone 2, 3-Q-20, lcn.

SOUTH LOUISIANA

East Baton Rouge Parish: Markley & Bankhead's McInnis 1, McInnis area, east of University field, 58-7s-12, lcn, company rig.

St. Mary Parish: Atlantic's H. M. Stagg's Adeline Sugar Factory, North Jeanerette area, 1980 ft s, 660 w ne c 19-13s-9e, lcn.

NORTH LOUISIANA

Caldwell Parish: R. L. Holcomb's Louisiana Central 1, ne se 38-13n-3e, lcn.

Richland Parish: Crown Central Petroleum Corp.'s D. R. Sartor 1, c ne sw 9-16n-6e, lcn.

Natchitoches Parish: Howard Youree's Reed 1, c nw sw 36-16n-8w, lcn.

Bayou Pierre's B. L. Brown 1, sw 25-10n-8w, rig.

NEW MEXICO

Eddy County: Robt. E. McKee and S. L. Jones' Jones 1, c ne sw 36-18s-26e, lcn.

MICHIGAN

Missaukee County: Turner Pet. Corp.'s Hemmes 1, s½ se ne 8-21n-5w, lcn.

Muskegon County: Muskegon Dev. Co.'s Sharp 1, s½ ne nw 29-11n-15w, rig.

Van Buren County: W. H. Clock's Marr 1, sw sw se 24-1s-16w, lcn.

OKLAHOMA

Bryan County: Amerada's Neff-Godfrey 1, se nw sw 22-6s-7e, lcn.

Kay County: Norbla and Mid-Continent's Burgett 1, se se se 25-27n-4e, Big lime 2735 ft, dr 2840 ft.

Lincoln County: Wilcox O&G Co.'s Blaney 1, se nw ne 14-14n-5e, br.

Okfuskee County: Kerlyn and Conoco's Kershaw 1, se se ne 15-12n-7e, woc 200 ft.

Payne County: Lewis Prod. Co.'s Turk 1, se se sw 8-18n-1w, dr 3810 ft.

Oklahoma Gasoline Plants' Potts 1, nw se nw 9-18n-6e, rur.

Carter County: Pure Pierson 1, nw ne se 6-3s-2e, lcn.

Jefferson County: Allied Materials' Hefner-Jones 1, sw sw ne 21-3s-4w, lcn.

Kay County: Alco Valve Co.'s Hajek 1, nw nw se 26-26n-1e, dr 1818 ft.

Lincoln County: Herndon Drlg Co.'s Terney 1, ne ne nw 30-12n-6e, dr 1925 ft.

Okfuskee County: Bryant & Miffitt 1-A Nuckols, c ne ne 9-10n-11e, rum.

Pawnee County: J. C. Crosbie, Weisz 1, ne sw nw 25-21n-4e, c&p.

Stephens County: Carl Carter's Pogue 1, c ne ne ne 32-1s-5w, machine rigging up.

EAST TEXAS

Kaufman County: Elbert Williams et al's Berryman 1, 440 ft out NWc 165-ac tr, E. Higdon sur, lcn Woodbine test.

NORTH TEXAS

Denton County: F. B. Vonder Hoya and C. H. Gannon's Aetna 1, 1447 ft from n and 495 ft from e lines J. Haynes sur A-573, dk.

Jack County: Chas. H. Kadane et al's L. Carter-Shell 1, 28 ft from n and 330 ft from w lines TE&L 3311, lcn 500-ft test.

WEST CENTRAL TEXAS

Coleman County: J. O. Fox & Son's Powell 1, 2232 ft from w and 330 ft from n lines BBB&C 23, sp on 3200-ft test.

Shackelford County: Roeser-Pendleton-Conoco's Nail 3-A-139, 1731 ft from s & 330 ft from w lines ET 139, lcn 1800-ft test.

WEST TEXAS

Pecos County: Standard of Texas' Smith-Douglas 1, c se se GC&SF 9, blk 194, sw of Yates field, lcn for Ellenburger test.

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Men in the Industry's News

F. A. WATTS, purchasing agent for Humble Oil & Refining Company, has been appointed director of materials division of PAW, Washington, replacing Greer W. Orton, former director of the division. Watts has been granted a six-months leave of absence. He was appointed purchasing agent September 1, 1938. A native of California, Watts joined Humble in 1919. He is a graduate of Stanford University with a degree in civil engineering. F. T. Fendley has been appointed acting purchasing agent during his absence.

A. CLARKE BEDFORD has been appointed general sales manager of Standard Oil Company of New Jersey and its affiliated Esso marketers. Bedford, who has been assistant general sales manager since 1936, succeeds R. T. Haslam, recently elected a director of Standard Oil Company (New Jersey).

The new sales head has been engaged in sales work with the company and its affiliates since 1920, when he was made a member of the marketing committee of the Jersey company. Prior to that, and following his graduation from Williams College in 1913, he had been engaged in refining, accounting and production work for various company interests. During World War I he served as a captain in the Quartermaster Corps and spent eight months in France. He returned to The Carter Oil Company and was secretary and assistant treasurer before joining the Jersey company marketing committee.

In 1926 he became joint manager of the Jersey company domestic sales department, and in 1927 went to New Orleans as a vice president and director of Standard Oil Company of Louisiana. Four years later he went to Boston as president of Colonial Beacon Oil Company, and in 1933 returned to New York as sales coordinator of Esso Marketers, continuing as president of Colonial Beacon. Three years later he became assistant general sales manager.

DON MILLER, Phillips Petroleum Company, has been transferred from Oklahoma City to Ponca City where he will be district superintendent.

H. O. HARDER, Cities Service Oil Company, succeeds Don Miller, resigned, as chairman of the Central Oklahoma Chapter of the American Petroleum Institute Division of Production.

W. W. KEELER, 45, died in Topeka, Kansas, January 4. Keeler, division geologist in Kansas for Skelly Oil Company, was on an inspection tour of new offices in the area.

P. E. FITZGERALD of Dowell, Incorporated, speaks before Tulsa Geological Society at noon, January 12, on "History and Development of Plastics."

GEORGE WEINSCHEL of Corsicana, Texas, formerly with Magnolia Petroleum Company, and since 1938 an operator in Texas and Illinois is in the Army.

J. F. M. TAYLOR and H. Bloemgarten have been appointed vice presidents of Shell Oil Company, east of the Rockies, effective January 1. Taylor as vice president of manufacturing, succeeds E. D. Cumming, who has been granted an indefinite leave of absence and was recently appointed director of refining under PAW.

Bloemgarten, who for the past year has been special assistant to the president in exploration and production operations, will continue to deal with this phase of the business in his new capacity.

W. F. SHERMAN, district superintendent in the Yale district and J. C. Dinger, drilling department manager in Oklahoma for Magnolia Petroleum Company, retired January 1 after 26 and 24 years, respectively, with the company.

R. G. RALPH has been appointed Mid-Continent division manager and H. K. Ihrig has been named manager of technical service department in the Mid-Continent area for Kobe, Incorporated, H. K. Browning, general sales manager, has announced.

Ralph, a graduate of Phillips University, had his first association with the oil production business with Phillips Petroleum Company in 1929 and led to activities in the field of general production practices and later in the specialized

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Complete Evaluation of Crude Oils
Long Distance 267, Box 132, Houston, Tex.

technical study of treating crude oils. In 1937, Ralph joined Clymer Company as sales manager and in 1939 became associated with Kobe, Incorporated, as a specialized sales engineer, and more recently has been responsible for the company's Mid-Continent technical activities as manager of the technical service department.

Ihrig, who succeeds Ralph as manager of the technical service department, attended the Missouri School of Mines and Oklahoma A. & M. Later he went to work as a petroleum engineer for Wilcox Oil & Gas Company and later Phillips Petroleum Company. In 1936, he became interested in the development of special equipment for the treatment of emulsified crude oils and studied problems involving nearly all of the Mid-Continent producing states.

T. R. MILLER, formerly special representative for Bethlehem Supply Company in the Gulf Coast area, was recently promoted to resident manager for Bethlehem Supply Company at Houston and will be in charge of the sales office. Miller succeeds C. H. Seger, Jr., who has enlisted in the Navy. Miller is a native Tulsan, graduating from Tulsa Central High School in 1920.

His first business experience was in banking. He spent four years with the old Central National Bank, then four years with the Security National Bank, both of Tulsa.

He received his first supply company experience when he joined one of Bethlehem Supply Company's predecessors in 1928. Since that time, he has served in various capacities throughout the Mid-Continent. His service has included sales and management in the following fields: Seminole, Maud, and Konawa Area, East Texas, Wichita and McPherson, Kansas, Ada and Fittstown, Oklahoma, and Hebbronville, Texas.

In 1938 he was transferred to San Antonio as a special representative and opened Bethlehem Supply Company's sales office at that point. He was transferred to Houston in 1939 as a special representative specializing in tubular sales in that area.

PAUL L. LYONS, chief scout for Stanolind Oil & Gas Company, Tulsa, has been elected chairman of the standing committee on oil field nomenclature of the Kansas-Oklahoma Division of Mid-Continent Oil and Gas Association, succeeding Paul G. Potter, chief scout for Shell Oil Company, Tulsa. R. B. Curran, chief scout for Carter Oil Company, Tulsa,, succeeds Vance E. Rowe, Petroleum Statistical Guide, as chairman of the Oklahoma steering committee. W. A. Moncrief, Lauck & Moncrief, Wichita, was named general chairman for Kansas, and E. A. Koester, Darby Petroleum Corporation, was elected chairman of the steering committee for Kansas.

BRUCE C. CLARDY, of Heyser, Heard & Clardy, Inc., Dallas, Texas, producing and drilling organization, and a regional manager of the conservation division of WPB, has been transferred to Washington to become chief of the pipe-line operations section of the Office of the Petroleum Administrator. Clardy will supervise purchases and sales of crude oil and refined products to be handled by government-owned pipe lines. He was in charge of Shell Oil Company's crude oil department in Texas and New Mexico for a number of years.

WARD W. WEST, geologist for Skelly Oil Company in West Texas, has resigned to join Lario Oil & Gas Company, Wichita, Kansas, which recently established district office at Midland to operate in the Permian Basin.

W. F. KNODE, consulting petroleum engineer, has moved from Corpus Christi to Fort Worth, where he has opened offices in the Fort Worth National Bank Building.

GEORGE E. HEAP of the Division of Geology of the Indiana Department of Conservation, Indianapolis, is now in the Army Air Corps. P. Hastings Keller, geologist from Detroit, Michigan, will be in charge of the oil and gas section of the division. Keller has been connected with the oil and gas industry for 15 to 20 years.

L. P. TEAS, consulting geologist, addressed the Houston Geological Society January 7 on "South American Observations." He illustrated his talk with motion pictures which he took on his extensive tour of South America two years ago.

KARL A. MYGDAL, district geologist for The Pure Oil Company, was elected president of the Fort Worth Geological Society, which will be host to members of the American Association of Petroleum Geologists when the latter holds its annual meeting at Fort Worth April 7-9. William J. Hilseweck, Gulf Oil Corporation, and Richard H. Schweers, The Texas Company, were chosen vice president and secretary-treasurer, respectively.

DANA M. SECOR, geologist for Skelly Oil Company in West Texas, has resigned to join the Permian Basin staff of The Atlantic Refining Company.

JOHN F. PENROSE, 75, retired operator and former official of National Oil Company when it was active in Mexico, died January 4 of a heart attack at Philadelphia. Survivors include a son, Neville G. Penrose, Forth Worth producer.

L. F. VAN HOUTEN of United Gas Pipe Line Company, Shreveport, Louisiana, will talk on and show a film of the construction of the company's Lirette-Mobile gas line, including water crossings, before the Gulf Coast Section of the AIME at Houston on January 12.

FRED W. BATES, geologist and paleontologist of Lafayette, Louisiana, has been retained as consulting geologist for the Gulf Coast area by Danciger Oil and Refining Company of Fort Worth.

P. N. McCULLOUGH, president of Commonwealth Oil Company and manager of National Oil Company of Texas, has been employed as coordinator by Consolidated Steel Company in the shipyards at Orange, Texas.

Squeaks from the Bull Wheel

Horse Sense

Someone has said that what America needs more than anything else in the management of its national affairs is just ordinary common horse sense. Now we are beginning to get some definitions on horse sense. Here are three:

"Horse sense is something a horse has that keeps him from betting on a human being."

"Horse sense is stable thinking."

"Horse sense is a quality that a horse has that can never be attained by a jackass."

Do you have any further definitions?

Well Gargled

Doctor: "Your throat is very bad. Have you tried gargling with salt water?"

Skipper: "Well, I've been torpedoed six times."

He Knows His Bars

The policeman's son was learning music:

"How many beats are there to the bar in this piece of music, dad?"

"Fancy asking a policeman a question like that," said the boy's mother. "If you asked your dad how many bars there were to the beat, he might have been able to tell you."

No Complaint

"I'm often compared with Lieutenant James Stewart of the Air Force."

"G'wan. Who would compare you with a movie star?"

"My wife. She seems to prefer Stewart."

Expectant

The country vicar in England was nailing some trelliswork up in his garden, when he chanced to look up and saw a London evacuee boy watching him. With a pleasant smile, he said:

"Well, my little man, are you interested in woodwork?"

"Not me, guv'nor," replied the boy. "I'm just waitin' to 'ear what a parson says when 'e 'its 'is thumb!"

Even Up

"I'd fire you in a minute if I thought I could get another man to fill your job."

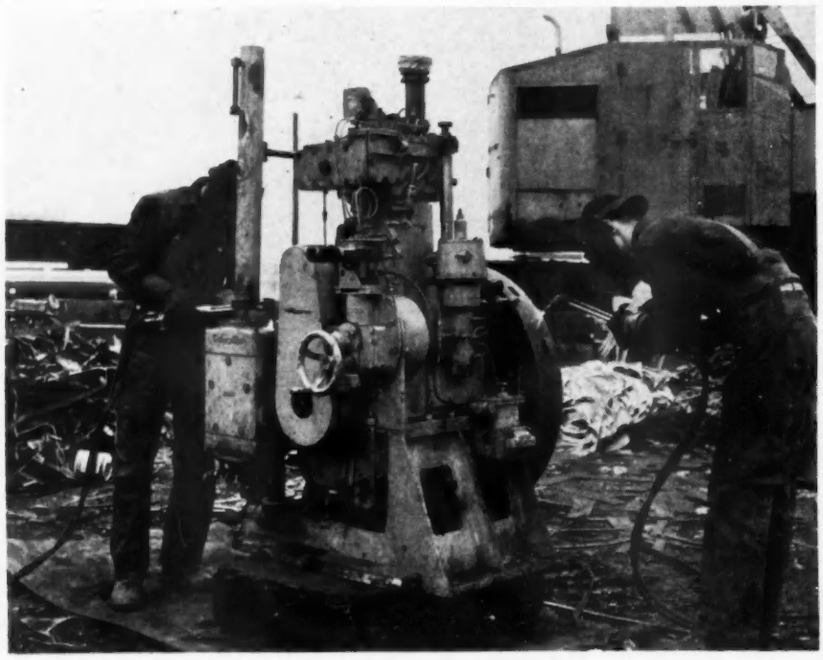
"And I'd quit in a minute if I was through with my night course in welding."

Profitable Business

"Why did you go out of the business of raising chickens?"

"I thought I could make more money raising chicken feed."

Notes for the Equipment Buyer and User



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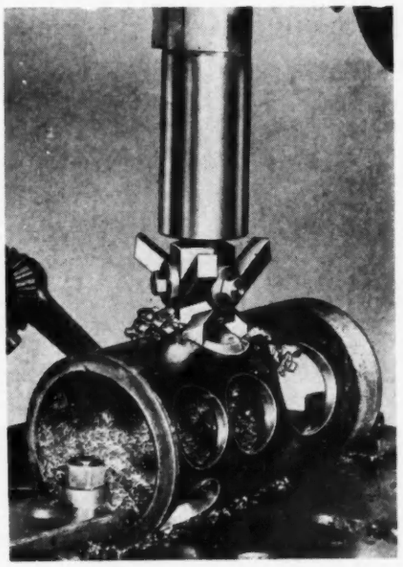

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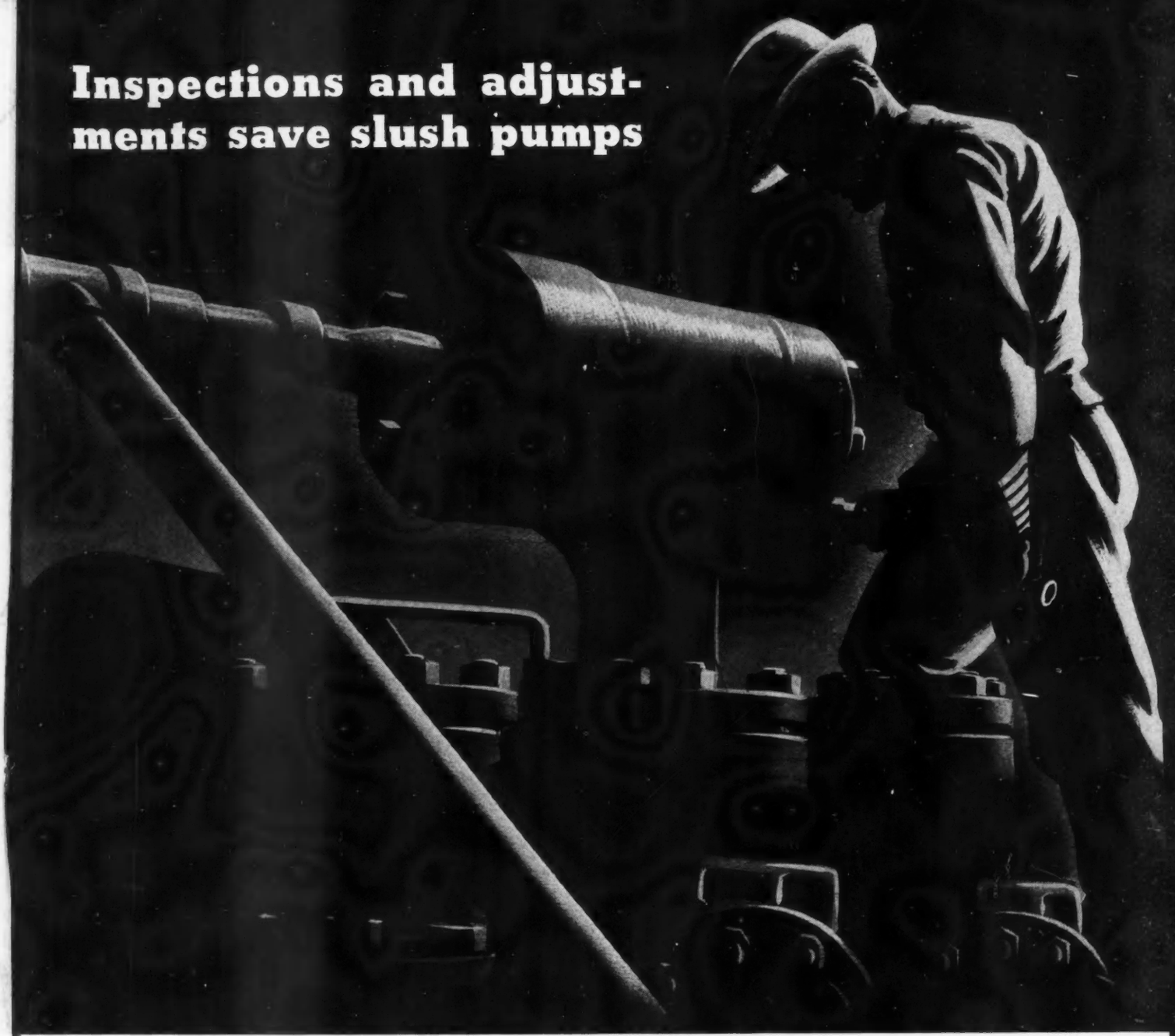
Weights and Data

Revere Copper and Brass, Incorporated, has issued its sixth edition of its handbook, which includes a new section giving technical and mill definitions and illustrations of terms used in the copper and brass industry. This information is said to be new and has not been previously released to those outside of the copper and brass industry itself.

In editing the sixth edition of the Revere Weights and Data Handbook, all chemical and physical properties have been revised to date, additional formulas have been included for calculating weights, and other formulas have been simplified. To further simplify data, each weight is calculated and expressed in three significant figures. In addition to direct weights of standard copper and brass alloys, conversion factors provide a ready means for determining the weights of Revere alloys in any standard form.

The handbook is available for selective distribution to executives, technical and research men, purchasing departments, engineering students, and government employes who have a definite use for it.

Inspections and adjustments save slush pumps



Information supplied by "Oil Weekly"

Every day and every tour check mud pumps for:

1. *Lubrication.* Fill lubricators. Then check each feed. Flush each grease-packed bearing. Check pump crankcase for quantity and quality. Draw small sample and centrifuge if water is suspected.

2. *Leakage.* Listen: leakage in the fluid end is audible. Even a slight whistle demands investigation. Liners, valve seats, even fluid ends have been saved by prompt leak detection.

3. *Adjustment.* Check liner adjusting screws. If slack, tighten. If condition repeats, liner or pump body failure may be indicated.

4. *Wear.* Rotate steam-pump rods quarter turn to equalize wear on rod, piston and packing. Do not use pipe wrench on rod wearing surface.

5. *Packing.* Check all stuffing boxes. If wrench tightening is required to seal, check for worn packing, worn bushing, mis-alignment or bent rod in this order and replace defective unit.

6. *Overload.* Check pressure-relief valve shear pin. Replace weekly. Pins fatigue in service, may fail below set value. Keep proper-sized standard nails hanging at valve. Do not use welding rod, taper pins, straightened or rusty nails.

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This book combines the rich, human interest features of the oil and gas industry in Texas since its beginning with the cold, statistical facts revealed in the more than 150 pages of tabular matter included.

In view of the ever-increasing importance of the oil and gas industry of the State of Texas and the fact that the number of pioneers of this industry is decreasing from year to year, it has been deemed advisable to present a history of the industry in this State, based on authentic information and prepared for ready reference.

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80,000 FEET OF HOLE
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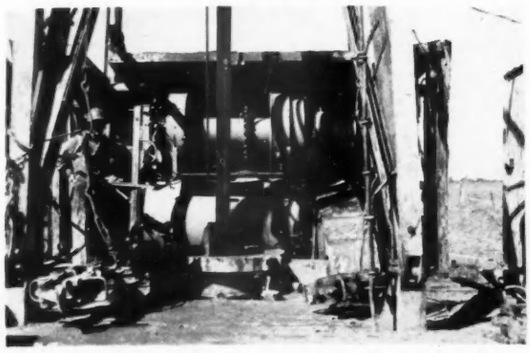
This draw works, with a Waukesha SRK engine, has drilled wells to 3,755 feet with 3½-inch drill pipe.



"Cardwell" Model H draw works and Lee C. Moore jackknife mast are mounted on an eight-foot subframe. Note automatic cathead and 12½-inch rotary table.

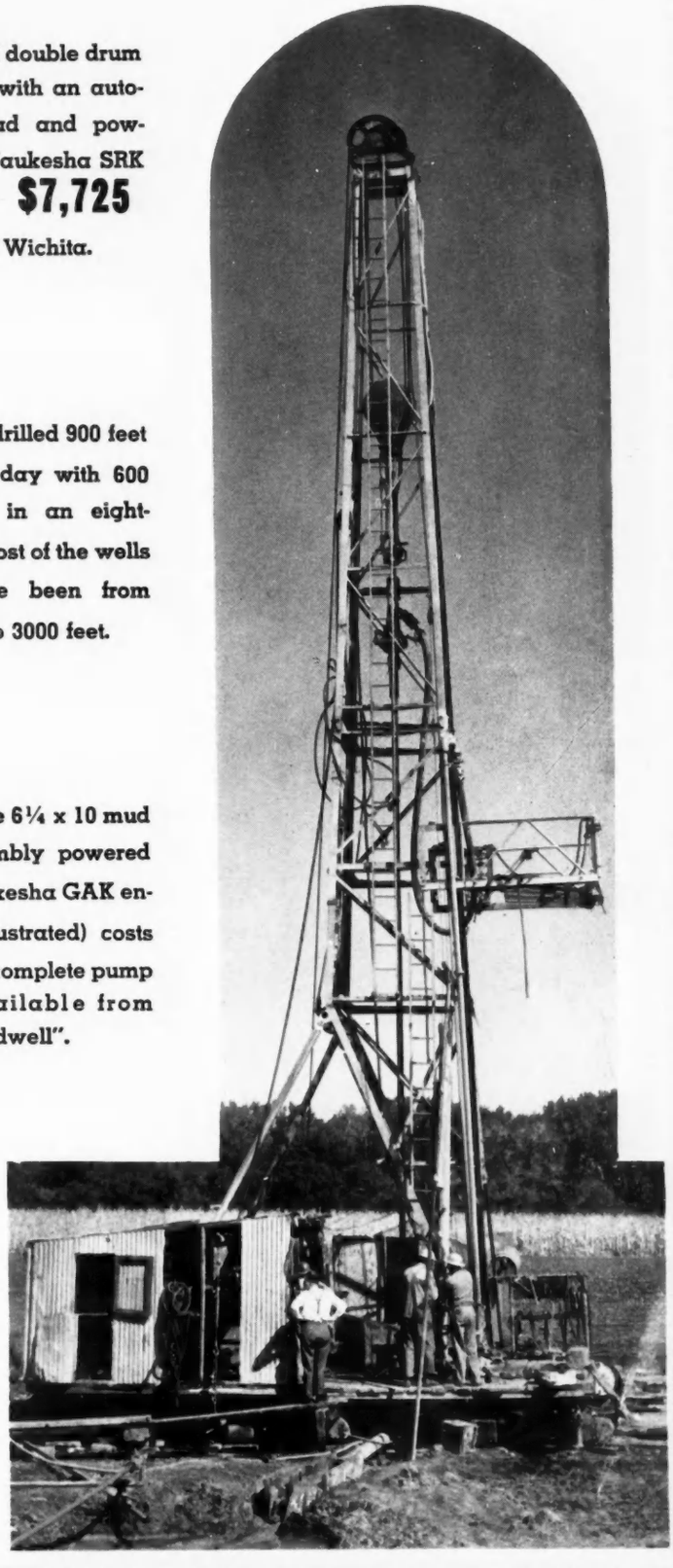
The separate mud pump assembly allows the pump to be located for maximum efficiency and is composed of a 6¼x10 mud pump, powered by a Waukesha GAK engine.

This Model H double drum draw works with an automatic cathead and powered by a Waukesha SRK engine cost **$7,725**

F.O.B. Wichita.

This rig has drilled 900 feet in a single day with 600 feet drilled in an eight-hour tour. Most of the wells drilled have been from 2200 to 3000 feet.

The complete 6¼ x 10 mud pump assembly powered with a Waukesha GAK engine (as illustrated) costs $7218. This complete pump unit is available from "Cardwell".



This "Cardwell" Model H is the lowest priced double drum draw works in the world — and still the best. This rig has worked practically every day, and many times on wells far beyond its rated capacity, yet this draw works has already drilled 80,000 feet without down time or repairs. The brake linings have not even been replaced. Another "Cardwell" rig of this type, owned by another operator, has drilled over 200,000 feet with a very low maintenance cost. The 513 "Cardwell" rigs of this type in use today (some of them are eight years old) have been developed through field testing and research.

We have two larger sizes of rigs of this same design: Model K, for drilling to 3,500 feet with 4½-inch drill pipe or to 5,000 feet with 3½-inch, and Model R, for drilling to 5,000 feet with 4½-inch drill pipe or to 6,000 feet with 3½-inch. All models can be quickly converted in the field for cable tool operations.

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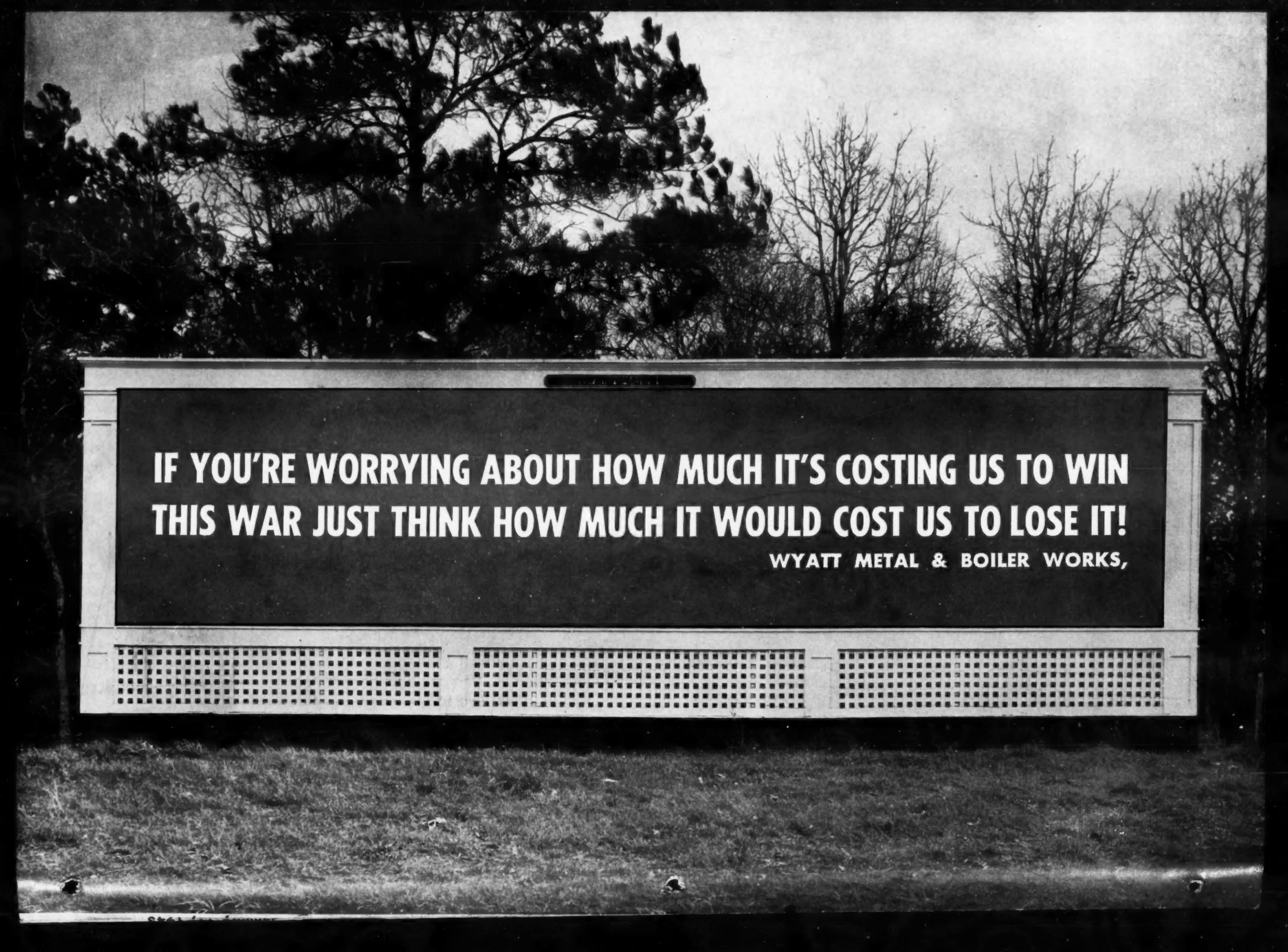
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THIS WAR JUST THINK HOW MUCH IT WOULD COST US TO LOSE IT!
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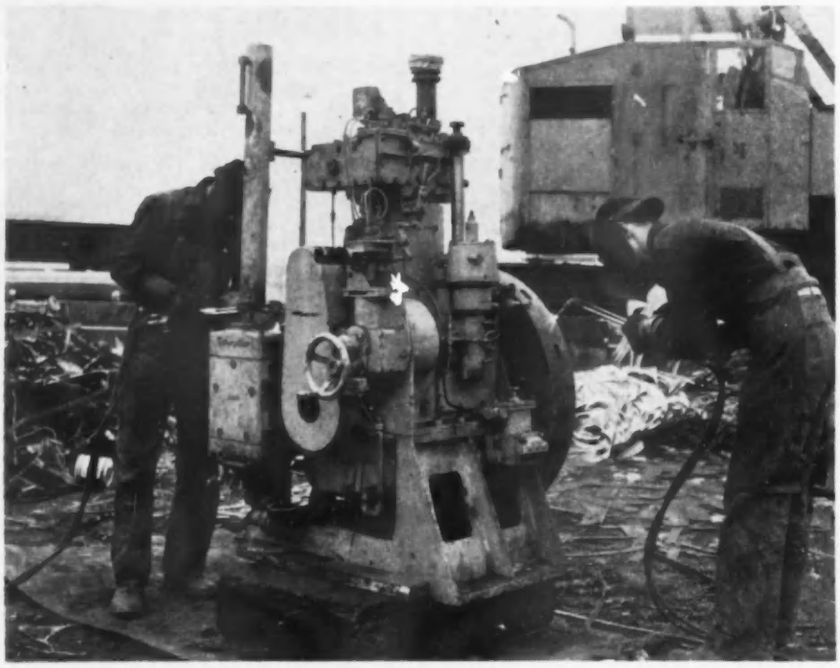
Notes for the Equipment Buyer and User



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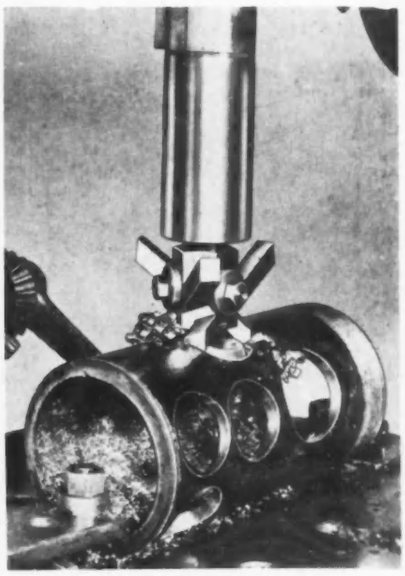

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